THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—41ST YEAR SYDNEY, SATURDAY, MARCH 27, 1954 No. 13

Table of Contents.

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES— Page.

An Industrial Aspect of Aviation Medicine, by F. S. Parle, M.B., B.S., D.P.H. 461
Air Transportation of the Sick and Injured in Civil Aircraft, by E. H. Anderson, M.B., B.S. 463
Air-Sickness is Preventible: Why Not Prevent It?, by J. C. Lane 465
Some Consideration of Mechanisms and Rationale of Treatment in Ante-Partum Hæmorrhage, by R. A. Thatcher, M.R.C.O.G. 467
Acute Staphylococcal Enterotoxin Food Poisoning in a Victorian Town, by E. J. Crowe, O.B.E., L.R.C.P., L.R.C.S.I., D.P.H. 468
Diverticulitis and Diverticulosis, with a Report on a Rare Complication, by T. P. Dearlove 470

REPORTS OF CASES—

Indolent Cutaneous Ulceration due to Infection with Mycobacterium Ulcerans, by B. R. V. Forbes, J. S. Wannan and the late W. B. Kirkland 475

REVIEWS—

The Parietal Lobes 480
Graphic Methods in the Study of the Cardiac Patient 480

NOTES ON BOOKS, CURRENT JOURNALS AND NEW APPLIANCES—

Family Doctor 480

BOOKS RECEIVED 480

LEADING ARTICLES—

Fear, Frustration and Futility in Industrial Medicine 481

CURRENT COMMENT—

Pulsus Alternans and Posture 482
Bee and Wasp Stings 483
Pyuria in Children 483
Day Treatment for Psychiatric Patients 484
The Role of Oxygen in the Genesis of Retrolental Fibroplasia 484
Colles's Fracture 485
The Use of Fructose in Diabetic Ketosis 485

ABSTRACTS FROM MEDICAL LITERATURE— Page.

Therapeutics 486
Neurology and Psychiatry 487

SPECIAL ARTICLES FOR THE CLINICIAN—

XCVII. Rubella (German Measles, Rotheln, Rubeola) 488

BRITISH MEDICAL ASSOCIATION NEWS—

Scientific 489

MEDICAL SOCIETIES—

Melbourne Pædiatric Society 495

CONGRESSES—

International Congress of Internal Medicine 499

NOTICE—

The R. H. Fetherston Memorial Lecture 499

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA 499

POST-GRADUATE WORK—

The Royal Melbourne Hospital Resident Medical Officers' Club 499

AUSTRALIAN MEDICAL BOARD PROCEEDINGS—

Tasmania 499

DEATHS 500

NOMINATIONS AND ELECTIONS 500

MEDICAL APPOINTMENTS 500

DIARY FOR THE MONTH 500

MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 500

EDITORIAL NOTICES 500

AN INDUSTRIAL ASPECT OF AVIATION MEDICINE.[1]

By F. S. PARLE, M.B., B.S., D.P.H.,
Melbourne.

AVIATION MEDICINE is concerned first and foremost with the medical aspects of flying. However, a practitioner working in this field soon finds that the medical aspects of the work performed by engineers and related tradesmen present a problem requiring attention. In the following paragraphs an outline will be given of the broad aspects of the work of the engineers concerned with servicing and overhauling aircraft.

Before this is dealt with attention must be drawn to the importance of the industrial medical officer playing an active part in promoting and encouraging a virile and enthusiastic "safety first" organization in the plants under his care. Many of the injuries seen in industry are preventible. To prevent them, "safety first" must be practised on a wide scale constantly.

An aircraft during its life is cared for from the engineering angle in two ways: (i) servicing and inspection at regular intervals; (ii) dismantling and rebuilding.

[1] Read at a meeting of the Special Group on Aviation Medicine at Brisbane on July 30, 1953.

SERVICING AND REGULAR INSPECTION OF AIRCRAFT.

The servicing and regular inspection of aircraft are performed out of doors mainly, and the engineers so engaged often work in conditions of wind, rain, cold, dust or heat, according to the season and locality. The work demands a robust constitution, good physique and a certain amount of agility, as these men are required to walk on the wings of an aircraft checking the fuel tank covers. As the outer portion of the wing of a DC4 aircraft is approximately twelve feet from the ground and does not offer a good surface for walking, this type of work is not devoid of danger.

In general, the hazards of this work are as follows: (i) foreign bodies in eyes; (ii) lacerations, abrasions, bruises from injury; (iii) minor indispositions possibly related to weather.

Foreign Bodies in Eyes.

Foreign bodies in the eyes occur from dust blown either by the wind or by the slipstream of an aircraft. They are simply removed in most cases.

Lacerations, Abrasions and Bruises.

Lacerations, abrasions and bruises result from knocks and other forms of injury. Most are simple and uncomplicated.

UNIVERSITY OF MICHIGAN LIBRARIES

This is an opportune time to stress one aspect of injuries generally, and that is the importance of trying to assess the strength of the forces causing them.

As an example, an instance can be quoted of an engineer who was struck a glancing blow by a revolving propeller. A small, lacerated wound was produced on his head. On examination he was conscious and not at all concerned by his injury. In view of the force of the blow an X-ray examination of the skull was made, which revealed a fracture of the parietal bone.

Indispositions Related to Weather.

It is often difficult to assess the role exposure to the elements may play in the causation or aggravation of diseases. Disorders such as fibrositis do appear to be aggravated by cold and damp; likewise, pterygia of the eyes are irritated by heat and dust.

OVERHAUL OF AIRCRAFT.

At regular periods throughout the operational life of an aircraft the airframe and engines are dismantled into various component parts for inspection, checking and repair. This involves quite a number of industrial processes. To simplify an explanation of these, the processes may be considered in the order in which they occur.

Engines.

Dismantling and Cleaning.

The dismantling and cleaning of engines is a dirty type of work, as there is a good deal of oil sludge and carbon on the engine components as they are stripped down. The next stage consists of "degreasing" them in trichlorethylene tanks and agitated solvent baths, and hand-cleaning in white spirit by means of brushes and steel wool. Other parts with very adherent deposits are cleaned in grain or sandblasting booths.

Industrial hazards associated with this stage are mainly dermatitis, abrasions and cuts slow in healing, and potential hazards with the grain-blasting booth. The last-mentioned are due to small amounts of sand mixed with the grain giving rise to a silicosis hazard and small amounts of lead salts in dust deposit from the booth.

Inspection.

The inspection of aircraft is comparatively free of medical problems, except for general problems such as lighting, ventilation *et cetera*.

Repair and Overhaul of Engine Components.

The repair and overhaul of engine components may be divided into various sections of the plant specializing in some process or handling one special component. These are welding, plating, heat treatment, machine shops, and hydraulic, propeller, electrical (including battery), instrument, fabric and carpenter's shops. Painting and sheet metal are concerned mainly with airframe work.

Welding.—The welding is mostly oxy-acetylene welding. Some electrical welding is done, and recently an argon electric arc type has been developed. In this shop two other processes are carried on—metal spraying with molten aluminium, and blasting with iron dust to clean pistons. Hazards are few, the main ones being "flash" from electric welding, annoyance from fumes, and the danger with argon arc welding of absorbing appreciable amounts of lead. Lead arises from inside exhaust pipes as they are cut and welded. Most of the work in this shop deals with these components.

Plating.—The plating section is a vast one covering many aspects of industrial toxicology. The position may be briefly stated as follows. Cleaning baths are sulphuric acid or cyanide baths, and splashes must be dealt with immediately. Plating baths (chrome) are sources of danger of burns from splashes and erosion of the nasal septum from vapour. The danger connected with the presence of lead is evaporation of the solution, and the formation of dust around the edge of baths must be watched. With regard to copper, silver and nickel plating, potassium cyanide is used in these baths. Care must be taken to prevent contamination of clothes and hands.

Heat Treatment.—The chief precautionary measure relating to heat treatment is to prevent any but trained staff from entering the area. Heat treatment baths contain molten sodium and potassium nitrate and other salts. If water is allowed to enter the bath a violent explosion may take place.

Machining Shops.—Processes performed in the machining shops are grinding, milling and turning and related types of machining. Good lighting is required on each machine, as work has to be done to small tolerances. The hazard is mainly that of dermatitis or skin affections arising from oils used to cool and lubricate cutting tools.

Hydraulic Shop.—In the hydraulic shop, hydraulic pumps, motors and pipelines are overhauled and repaired. During the testing of equipment before it is installed in aircraft, noise is a problem. The quality and intensity of noise produced by a hydraulic pump under test are such as to be almost unbearable. Some employees may at times show a sensitivity to hydraulic fluid.

Propeller Shop.—Blades are cleaned by being ground before overhaul. This gives rise to a fine dural (aluminium alloy) dust.

Electrical and Battery Section.—Chlorinated naphthalenes are occasionally used to insulate cables. When heated these give rise to fumes which are toxic under conditions of poor ventilation. Hazards associated with work on batteries arise from handling plates, leading to the possibility of lead absorption. The danger is unlikely to arise unless batteries are being completely rebuilt.

Instrument Shop.—The main concern in the instrument shop is with the process of repainting and touching up instrument dials with radio-active paint. It is a well-established process, and the precautions to be taken are clearly laid down. From time to time employees may be found who are sensitive to one of the cleaning agents used. Dermatitis is produced, which settles down with a minimum of treatment.

Fabric and Carpenter's Shop.—No specific hazard exists in the carpenter's shop. Mention must be made of the solvents used for doping fabric. These may contain benzol.

The Testing and Running in of Engines.

The testing and running in of engines are performed on an engine test truck; the engine is mounted in front of a small cabin in which an engineer controls the motor and studies its performance. Now and again the cabin needs to be checked for carbon monoxide content. This gas is present in engine exhaust fumes.

Airframe.

Work on the airframe is comparatively free of industrial problems. The following two processes should be mentioned. (i) Cadmium painting is widely used as anti-corrosion cover on some of the metal parts. Pulmonary œdema or urinary symptoms may appear in cases of cadmium poisoning. This is an unlikely occurrence. (ii) The fuselage shell of an aircraft is covered on the inside with glass wool quilted covers. Glass wool if handled produces an annoying rash due to minute spicules of glass fibre becoming embedded in the skin.

CONCLUSION.

This brief outline of some of the processes carried on in the aviation industry is given to indicate their diverse nature. Often the description a patient may give of his work indicates little of the true nature of it. This applies particularly when modern cleaning agents or sealing compounds are used.

Finally, mention must be made of the responsibility of the industrial medical officer to keep his fellow practitioners, particularly those in general practice, informed of the medical aspects of the industry in which he is working.

AIR TRANSPORTATION OF THE SICK AND INJURED IN CIVIL AIRCRAFT.[1]

By E. H. ANDERSON, M.B., B.S.,
Director of Medical Services, Australian National Airways, Proprietary, Limited, Melbourne.

AIR TRANSPORTATION of the sick and injured in civil aircraft could well be the subject for a full evening's discussion. I propose to discuss it from the viewpoints of the various people concerned and to confine my remarks to transportation within Australia.

From the patient's viewpoint, air travel has a great deal of attraction. It is speedy, comfortable and clean, and in most cases cheaper than road ambulance. Especially is it attractive to people in the outback, and there is no doubt that the Flying Doctor Service and air transportation generally have given these people a greater feeling of medical security. One has only to think of a road journey of, say, 300 miles over even fair roads—and some outback roads are far from that—to understand why a patient prefers an air journey of a couple of hours in comfortable surroundings and with very little hazard.

TABLE I.[1]

Diagnosis and Symptoms of Airsickness and Other Discomforts in Military Evacuees, January, 1947, through February, 1948.

Diagnosis.	Total Number of Evacuees.	Symptoms Observed.	No Symptoms Observed.
Mental diseases:			
Neuroses	140	22	118
Psychoses	68	10	58
Respiratory diseases:			
Tuberculosis, respiratory diseases	97	13	84
Pneumonia	8	1	7
Other	25	6	19
Circulatory diseases:			
Rheumatic fever	30	6	24
Arteriosclerotic heart disease	8	1	7
Other	24	4	20
Wounds and injuries:			
Fractures of limbs, spine, trunk	14	5	9
Fractures of skull	8	3	5
Concussions	4	0	4
Other	11	4	7
Diseases of the nervous system:			
Epilepsy	12	2	10
Other	6	1	5
Diseases of the digestive system	16	6	10
Diseases of the ear	16	3	13
Neoplasms	15	5	10
Diseases of the bones *et cetera*	14	11	3
Miscellaneous infections and diseases	50	22	28
Total	566	125	441

[1] After Duff *et alii* (1948).

From the general practitioner's viewpoint, the situation is just as attractive—again, particularly to those in outback places where treatment and diagnostic facilities may not be very good. When the general practitioner may hesitate to send a patient by surface transport to a well equipped medical centre, he has very little hesitation about sending him by air. Most practitioners realize that there are certain limitations to air travel, but in most cases they believe that the advantages so far outweigh the disadvantages that any medical risk is well worth taking.

The ambulance services also look on air transport with fairly general favour. For them it means greater availability of their vehicles and personnel where they are most needed.

From the domestic airlines' point of view there are certain reservations to this glowing outlook. It would suit them better not to carry patients on scheduled flights. Carriage of patients usually means greater responsibility for the operating crews, provision of special equipment, delays in loading and unloading and sometimes inconvenience for other passengers. Added to this is the feeling of responsibility of the medical departments to make sure that the patients carried are fit to undertake the journey. However, in the absence of organized air ambulance services, the airlines accept the natural obligation placed on them to provide a service which is undoubtedly required, and will do so providing adequate safeguards are taken.

The popularity of air transportation is itself a tribute to its safety, and this is borne out by statistics compiled by various responsible organizations.

It has to be remembered that these patients were carefully "screened" before carriage, were in the hands of highly trained people, and had the benefit of special treatment facilities during the journey. The comparatively high figures for the China-Burma-India area were undoubtedly largely attributable to local operational factors.

From the experience gained during and since the war, it has become increasingly evident that air travel is the preferred mode of transportation for sick people. A good general rule is that if patients can be moved by any means at all, they can probably be carried by air with greater ease and safety than in any other way.

In a report dated March, 1953, the International Air Transport Association circulated the following information.

(*a*) The incidence of deaths as recorded was 1·8 for every million passengers carried or 2·23 for every million passenger miles flown.

(*b*) Of the 115 deaths recorded, the causes were apparently:

Coronary occlusion	63%
Other cardio-vascular diseases	7%
Brain disease or injury	10%
Lung disease	5%
Cancer or other conditions	15%

(*c*) The death rate from natural causes during journeys by air appeared to be considerably less than that for those travelling by rail as assessed from statistics of British and Canadian railways. The difficulty here was that the age groups and physical condition of the individuals at risk were not strictly comparable.

Since the majority of patients in Australia are carried in non-pressurized aircraft, selection resolves itself into the question whether the patient will be affected by moderate lack of oxygen (rarely do non-pressurized aircraft fly at heights above 8000 to 10,000 feet), lowered atmospheric pressure or airsickness. Those likely to be so affected are, broadly speaking, those with diseases of the circulatory system, diseases of the respiratory system including the upper part of the respiratory tract, diabetes, certain gastro-intestinal diseases in which the expansion of gas or airsickness may cause trouble, acute mental conditions (particularly psychoses), and shock.

Many articles have been published in the medical journals setting out the contraindications and limiting factors to air travel, the most recent being that of Sir Harold Whittingham (1953).

Experience has shown that some method of selection and control of this form of carriage is necessary. More careful selection by general practitioners is needed, and more information than is generally provided on ordinary medical certificates.

To overcome these inadequacies it has been proposed that specific information should be furnished by the patient's physician before a patient is accepted for transportation. This is a common practice amongst airlines operating in other countries, and especially amongst those operating international routes. The following common form of medical certificate is now in use by the two major domestic airlines in Australia:

[1] Read at a meeting of the Special Group on Aviation Medicine at Brisbane on July 30, 1953.

UNIVERSITY OF MICHIGAN LIBRARIES

TABLE II.[1]

Number of Patient Flights Made by the United States of America Air Force and Death Rates in Flight for the Period January, 1943, to April, 1947.

Theatre of War.	1943.		1944.		1945.		1946.[2]		Total.		Death Rate per 100,000.
	Patients.	Deaths.	Patients.	Deaths.	Patients.	Deaths.	Patients.	Deaths.	Patients.	Deaths.	
Far Eastern	95,575	3	68,563	1	90,452	2	0	0	254,570	6	2·4
European	26	0	151,532	4	208,736	3	148	0	260,442	7	1·9
Mediterranean	62,405	1	125,878	1	24,002	1	0	0	212,285	3	1·4
Burma-China-India	1,620	0	75,509	21	58,095	2	49	0	135,273	23	17·0
A.T.C.	8,767	0	117,151	2	212,830	4	17,432	0	356,180	7	2·0
All others	5,134	0	6,371	0	30,013	0	1665	0	43,183	0	0
Total	173,527	4	545,004	29	624,128	12	19,294	0	1,261,933	46	3·4
Death rate per 100,000 patients	2·3		5·3		1·9		5·2		3·4		

[1] After Schaeffer (1948).

[2] Includes the first three months of 1947.

CERTIFICATE OF FITNESS TO TRAVEL BY AIR.

1. *Name* (in full) Mr./Mrs. Miss.....
2. *Address* .....
3. *Age*.....
4. *Diagnosis of Condition* .....
5. *Severity of Disability* (mild, severe) ....
6. *Will any treatment be necessary during the flight?*
   If so, what is the nature of it? .....
7. *Will supplementary oxygen be required during flight?* .....
   (if so, please arrange with office or route agent.)
8. *If not a stretcher case, can the patient walk unaided to and from the aircraft?* .....
9. *Is the patient, in your opinion, fit to undertake the proposed journey by air,*
   From..... *To*..... *on* (date).....
10. *Is the journey essential for the patient's health? If not, please state the reasons for the journey.*
    .....
11. *Is there an alternative means of transport?* .....
    .....
12. *I certify that the patient is not suffering from a communicable disease at an infective stage and is not objectionable to other people by sight, smell or behaviour.*

Date..... *Signed*.....
(Medical Practitioner.)

To assist the doctor in charge of the patient, the following information is provided with the certificate:

1. Carriage will generally be in unpressurized aircraft —therefore any patient in any degree lacking in compensation should have supplementary oxygen available. This can be provided if adequate notice is given.
2. An attendant *must* accompany the patient if more than a minimum of attention is required or patient is a stretcher case, and be responsible for carrying out any treatment during the flight with the exception of oxygen administration, which will be the responsibility of the air hostess.
3. In cases of pregnancy, carriage will not be accepted if the patient is beyond the eighth month, unless the doctor certifies that there will be no risk of parturition during the journey.
4. Any equipment which may be necessary for treatment *en route* (e.g., syringes, drugs, urinals, hot water bottles) must be provided by the patient.
5. Air hostesses are trained only in first aid. They are not trained to give injections and are expected to pay full attention to ordinary passengers.
6. The following types of cases need to be seriously considered before being assessed as fit to travel by air:
   (i) Anæmias of severe degree.
   (ii) Acute otitis media and sinusitis.
   (iii) Cirrhosis of the liver, with congestive failure.
   (iv) Contagious diseases.
   (v) Diabetes of severe degree.

TABLE III.

Passenger Deaths Occurring in Flight and After Deplaning in Scheduled Air Transportation, 1930 to 1951.

Year.	Number of Deaths.		Revenue Passengers. (Thousands.)	Total Deaths in Flight per Million Revenue Passengers.	Revenue Passenger Miles. (Millions.)	Total Deaths in Flight per Billion Revenue Passenger Miles.
	In Flight.	After Deplaning.				
1930 to 1941	6	7	10,156	0·6	3,861	1·6
1941	0	0	4,078	0·0	1,511	0·0
1942	1	2	3,398	0·3	1,620	0·6
1943	1	0	3,315	0·3	1,899	0·5
1944	1	1	4,387	0·2	2,445	0·4
1945	3	1	7,052	0·4	3,730	0·8
1946	16	10	13,255	1·2	6,652	2·4
1947	21	2	14,251	1·5	7,553	2·8
1948	10	—	14,543	0·7	7,853	1·2
1949	10	4	16,616	0·6	8,820	1·1
1950	12	2	19,102	0·6	10,218	1·1
1951	10	4	24,669	0·4	13,167	0·7
Total	91	33	134,822	0·6	69,329	1·1

[1] From data obtained from the airline medical departments and the Civil Aeronautics Administration (of America).

(vi) Hypertension where the blood pressure is greater than 200/120, or where there are gross cardiac or ocular signs.

(vii) Lung conditions with copious or foul expectoration.

(viii) Major epileptic or mental diseases.

(ix) Peptic ulcers if bleeding.

(x) Pneumonias within a fortnight of attack, pneumothoraces, and pulmonary tuberculosis with tubercle bacilli in the sputum.

(xi) Post-operative abdominals within ten days of operation.

(xii) Pregnancies beyond the eighth month.

(xiii) Skin diseases which are contagious or repulsive to others.

(xiv) Uncompensated heart diseases, also recent coronary occlusion and angina pectoris.

7. These practices are as recommended by the International Air Transport Association.

The general rule would be to accept every patient if possible, due consideration being given to the interests of the patient and of other passengers, and also, of course, to flight factors over the route and on the day selected. There must always be given the captain of the aircraft an overriding power to refuse to carry a patient. This power would be exercised only when the safety of the aircraft and passengers was endangered, or when the patient was suffering from a disease or repulsive condition which might endanger, inconvenience or disturb other passengers. It has to be remembered that it is almost impossible to segregate an individual in a civil aircraft on a normal scheduled flight, as can be done in other forms of transport.

We have been dealing particularly with those patients of whom some knowledge is available before the flight. Difficulties occur more often with patients whose illness is not made known to the operators before the flight. Most of these people travel in ignorance of any limiting factors; nevertheless it is surprising how many people elect to travel by air contrary to medical advice. It says much for the safety of air travel that although these people cause much anguish to the cabin attendant, very few of them are seriously affected by flying.

It is difficult to know what can be done about these people. It is utterly impracticable and most undesirable to screen passengers generally. Undoubtedly as air travel becomes more popular and as design improves, further factors will have to be considered. On the one hand the use of pressurized cabins will become more general; but it will be many years before ground level pressures are maintained throughout a flight, especially in outback areas and on feeder routes. On the other hand, it may be that as flying becomes more popular, people with a lower standard of fitness may travel. However, there can be no doubt that technical advances will load the balance heavily in favour of the patient.

Cabin attendants, with few exceptions, are trained only in first aid. If an emergency arises during flight which is beyond the capability of the cabin attendant to control, the usual practice is for the captain to decide whether to go on to his destination, to return to his departure point or to land elsewhere. His decision will depend largely on the crew's assessment of the situation and on advice which he may have sought and received by radio. His decision will be strongly influenced by the actual flying conditions, for he must place the safety of the aircraft and other passengers before that of an individual.

Only comparatively small first aid kits are carried in commercial aircraft for use during a normal flight. Equipment is not provided for treatment of special conditions.

Conclusions.

1. Air transportation of sick and injured people in civil aircraft is, with proper safeguards, a satisfactory and preferred mode of transport.

2. Domestic airline companies in Australia are willing to accept a reasonable obligation to carry sick or injured people on scheduled air routes, giving preference to feeder over main line routes.

3. Satisfactory control and screening of patients are necessary, and will require the full cooperation of practitioners.

4. As a broad rule of acceptance, patients must be fit to fly and must not be a hazard or embarrassment to the normal travelling public.

5. Guidance in regard to limiting factors in air transportation is available to practitioners from the literature and from airline medical departments.

6. The control of sick people travelling in ignorance of limitations or in defiance of medical advice will always remain a problem for operating crews.

7. With greater population, Australian conditions may well demand the establishment of properly organized aerial ambulance services, in which the helicopter can play an important role.

References.

DUFF, F. L., PLETCHER, K. E., and CUTTER, S. J. (1948), "An Analysis of the Effects of Aerial Transportation of Patients", Project 21-02-035, Report 1, U.S. Air Force, School of Aviation Medicine, Randolph Field, Texas. See also STRICKLAND, B. A., junior, and RAFFERTY, J. A. (1951), "Effects of Air Transportation on Clinical Conditions", *J.A.M.A.*, 145: 129.

MCFARLAND, R. A. (1953), "Human Factors in Air Transportation", Harvard School of Public Health.

SCHAEFFER, J. N. (1948), "Deaths in Air Evacuation", *J. Aviation Med.*, 19: 100.

WHITTINGHAM, H. (1953), "Medical Affects of Air Travel", *Brit. M. J.*, 1: 556, 610.

AIR-SICKNESS IS PREVENTIBLE: WHY NOT PREVENT IT?[1]

By J. C. LANE,
Melbourne.

AIR-SICKNESS is, at certain times of the year and on certain routes, a very real drawback to air travel in this country. Much of the flying is still done and will continue to be done in unpressurized aircraft which are restricted as to altitude and cannot always climb "over the weather". On inland routes in the summer, when aircraft repeatedly have to climb and descend through turbulence extending as high as 9000 feet, the air-sickness rate is high—so much so that at some of the smaller airfields it is something of a problem to dispose of air-sickness bags.

Prevention of air-sickness is thus a worthwhile objective. Moreover, it is a realizable one, since air-sickness is a physiological response, not, as is commonly believed in the airline industry, "all psychological".

The evidence available at the end of 1950 as to the value of motion sickness preventive drugs was reviewed in a memorandum circulated by the Department of Civil Aviation in February, 1951. The object of the present paper is to bring this review up to date.

It is convenient to list the conclusions of the earlier review and to check their validity in the light of the newer information. The main conclusions which, it will be shown, are still tenable, were in brief as follows: (i) Hyoscine is well established as an effective preventive. Hyoscine aminoxide is probably equally effective. (ii) The antihistamine drugs "Benadryl" "Dramamine" and "Perazil" are effective. (iii) Hyoscine is somewhat more effective than the antihistamines in preventing air-sickness. (iv) There are indications that combinations of hyoscine and antihistamines may give most protection for fewest side effects.

[1] Based on a paper read at a meeting of the Special Group on Aviation Medicine at Brisbane on July 30, 1953.

UNIVERSITY OF MICHIGAN LIBRARIES

In the discussion use will be made of the term "protection rate". This is defined by the following expression:

$$\frac{\%\text{ sick in control} - \%\text{ sick in treated group}}{\%\text{ sick in control group}} \times 100$$

It is thus the percentage of susceptible subjects (that is, those who would have been sick if untreated) who are protected by the drug under study. Two points must be noticed using this index: (i) the difference in sickness rates in the treated and untreated groups must be statistically significant; and (ii) the sickness rate among the untreated must be taken into account, because the percentage protected by a given drug varies inversely with the percentage sick in the control group.

Evidence (shown in Table I) continues to accumulate on the effectiveness of hyoscine in doses of 0·65 milligramme (1/100 grain) to 1·0 milligramme (1/64 grain).

TABLE I.

Author.	Motion.	Dose. (Milligrammes.)	Percentage Sick in Control Group.	Percentage Protected.
Glaser and Hervey	Sea.	1·0	47·0	94·0
Glaser and Hervey	Sea.	1·0	36·0	92·0
Chinn	Sea.	0·75	20·0	47·0
Chinn	Air.	0·65	11·0	60·0
Chinn	Air.	0·65	6·8	80·0

Chinn *et alii* (1950*a*) found two milligrammes of "Scopodex" (hyoscine aminoxide) to be equally as effective as "Benadryl" (25 milligrammes) with hyoscine (0·35 milliramme) on regular navigator training flights. In further similar studies "Benadryl" (25 milligrammes) with "Scopodex" (1·0 milligramme) and 25 milligrammes of lergigan (an isomer of "Phenergan") were both shown to be effective, but neither was superior to the "Benadryl"-hyoscine combination.

In all these trials the sickness rates in the untreated groups were rather too low for good discrimination. With a more discriminating sickness rate of 25%, in trials in which a simulated turbulence technique in DC-3 aircraft was used, "Perazil" (50 milligrammes) was shown to be somewhat effective, but much less so than the "Benadryl"-hyoscine combination.

The effectiveness of "Dramamine" against air-sickness was demonstrated by Maycock and Morant (1951), who used as subjects paratroopers in towed gliders. Gay (1951) has collected reports on the effect of "Dramamine" as a preventive of vomiting due to a variety of causes; but with one exception these studies were uncontrolled, and there is no means of judging the validity of the conclusions drawn. This comment also applies to airline trials (Lederer and Kidera, 1952), which purport to demonstrate a curative as distinct from a prophylactic effect. The exception is a troopship trial, in which the protection rate was 88% when the rate among the untreated was 43%—an apparently good performance, but no data beyond these bare percentages have been published.

Perhaps the most impressive of recent studies are those of Glaser and Hervey (1951), who compared the effectiveness of hyoscine, promethazine ("Phenergan") and "Benadryl" against sea-sickness. With a sickness rate of 47% among the untreated subjects, hyoscine (1·0 milligramme) protected 94%, "Phenergan" (25 milligrammes) 64%, and "Benadryl" (25 milligrammes) 44%, the rates for the last two not being significantly different.

A further series of carefully designed and controlled trials (Glaser and Hervey, 1952), in which the subjects were exposed to motion on rubber floats in a swimming pool with an artificial wave motion, gave the results shown in Table II. The control sickness rate was 36%.

Of the differences between rates, only those between "Phenergan" and each of the other drugs are significant. The results bring out the importance of hyoscine for the attainment of a high protection rate.

It has been demonstrated previously that "Dramamine" and "Benadryl" are indistinguishable functionally. In "Dramamine" the hydrochloride group of "Benadryl" is replaced by 8-chlorotheophylline, a compound known to be inert in regard to motion sickness. A similar compound of promethazine and 8-chlorotheophylline ("Avomine") has been reported as effective in sea-sickness (Harper, 1951);

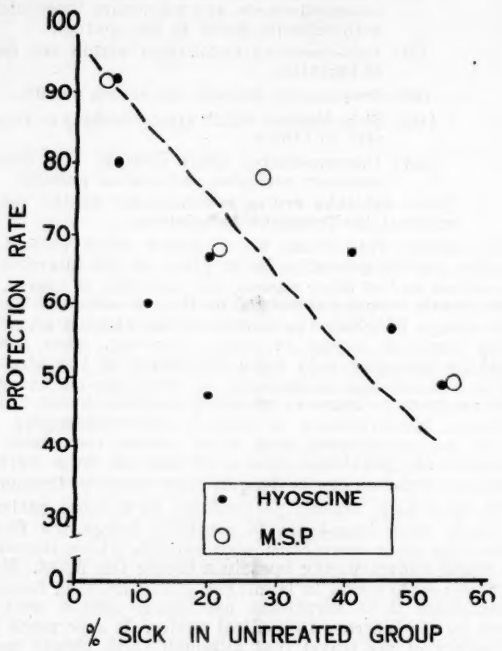

FIGURE I.

The scatter diagram demonstrates the inverse relationship between the sickness rate in the untreated group and the protection rate attained by hyoscine (0·6 to 0·75 milligramme) and MSP (hyoscine 0·4 milligramme, atropine 0·32 milligramme, "Amytal" 130 milligrammes), which have equal protective effects. (Data from various authors.)

but this trial was uncontrolled and the results must be regarded as suggestive only. However, because of the effectiveness of "Phenergan", there is no reason to doubt that "Avomine" is also effective.

Chinn and Milch (1952) used the simulated turbulence technique to compare with "Phenergan", trimetron and

TABLE II.

Drugs Given.	Protection Rate. (Percentage.)
Hyoscine, 1·0 milligramme	92
"Phenergan", 35·0 milligrammes	64
Hyoscine, 1·0 milligramme, and "Phenergan", 25·0 milligrammes	94
Hyoscine, 0·65 milligramme, and "Phenergan", 15·0 milligrammes	89
Hyoscine, 0·65 milligramme, "Phenergan", 15·0 milligrammes, and mannitol hexanitrate, 50·0 milligrammes..	83

lergigan. With the sickness rate in the control group at 32% the protection rates were 75%, 53% and 56%, these rates not being significantly different.

Chinn *et alii* (1953) tested the same drugs together with hyoscine, pyrrolazote, "Postafene" and two experimental drugs, "Wellcome 47-83" and "Wyeth 46-062", on some 10,000 air-borne troops on two 1000-mile airlifts. All drugs

but the last-named were effective; but the sickness rate among the untreated was too low for discrimination between them.

Although many claims have been made for many of these drugs as curative agents, notably for the antihistamines, the experimental designs of the studies cited do not in general take account of the phenomenon of adaptation—the spontaneous cure that occurs in many people who continue to be exposed to motion, as on a sea voyage. The one properly controlled study, that of Chinn (1950*a*), failed to demonstrate any significant curative action either for "Dramamine" or for hyoscine.

In contrast to this negative result, the second trial of Glaser and Hervey gave the important information that hyoscine given as late as five to ten minutes before exposure to motion is still fairly effective—69% of subjects were protected, as against 88% by a dose given one and a quarter hours before exposure.

This finding has important implications for air travel: a preventive dose taken at the airport passenger lounge will provide worthwhile protection.

The earlier review discussed side effects at some length and called attention to the relative safety of hyoscine when given by mouth. A search of twenty-seven years' literature has failed to disclose a single fatality due to orally administered hyoscine. The results of Glaser (1953) show that fears of cumulative poisoning by hyoscine or promethazine are unfounded.

Side effects of hyoscine, of various antihistamines and of combinations of the two have been recorded very carefully in the trials already referred to. It is remarkable how frequently various symptoms, such as dizziness, sweating, dry mouth, incoordinated movements, headache and excessive fatigue, are reported by those who have taken a dummy tablet.

Since a number of these symptoms may be associated with incipient or suppressed air-sickness, Glaser (1953) determined the frequency with which symptoms were reported by subjects given various medicaments but not exposed to motion. Drowsiness, headache, nausea, giddiness, blurred vision, flushing, dry mouth, fatigue and inability to concentrate were all noticed more frequently by those who had taken one milligramme of hyoscine than by those who had had a dummy tablet. Some of these symptoms were more frequent in those who took hyoscine than in those who took 25 milligrammes of promethazine or 25 milligrammes of "Benadryl".

In interpreting these findings it should be noted that the dose of hyoscine was somewhat larger than that usually recommended for airline use. As Glaser points out, some side effects must be accepted if a high protection rate is to be achieved. But side effects occurring significantly frequently in subjects orientated to notice them will not necessarily be important or even noticeable in the practical use of the drug. In the flight situation the studies of Chinn and of other United States Air Force investigators would indicate that dryness of the mouth (and decreased sweating, in addition, with hyoscine) is the main side effect regularly occurring.

As an addition to the already substantial data attesting the general lack of effect of motion sickness preventives on psychomotor and mental performance, Mackay and Ferguson (1951) report results of studies with a complex coordination test and a rapid calculation test. "Dramamine" (100 milligrammes), a mixture of belladonna alkaloids, hyoscine (0·6 milligramme) and the Royal Canadian Navy remedy (l-hyoscyamine 0·8 milligramme with hyoscine 0·5 milligramme and niacin 100 milligrammes) were without effect in both tests.

Summary.

In summary, the considerable body of evidence shows that there are a number of drugs available which are undoubtedly prophylactic and which have but minor side effects. According to Glaser and Hervey, ". . . all likely remedies have now been investigated during the last 8 years in (England) and in North America. No further improvements can be expected, except by accident or by a systematic study of basic principles". The effective drugs are hyoscine, hyoscine and "Benadryl", hyoscine aminoxide, "Benadryl", "Dramamine", "Phenergan", lergigan and avomine.

In my opinion the medication of choice is the administration of "Benadryl", 25 milligrammes, with hyoscine, 0·33 milligramme.[1] This combination will prevent air-sickness in 40% to 90% of air travellers who would otherwise be sick.

Air-sickness is not rare on the trunk routes and is distinctly common on services in the interior of the continent. About three-quarters of this air-sickness can be prevented. Airlines therefore could and should make more use of proven and safe preventives.

Acknowledgement.

This paper is published with the permission of the Director-General of Civil Aviation.

References.

"Motion Sickness—Present Status of Preventive Drugs", 1951. Aviation Medicine Memorandum No. 6, Department of Civil Aviation.

CHINN, H. I., NOELL, W. K., and SMITH, P. K. (1950*a*), "Prophylaxis of Motion Sickness", *Arch. Int. Med.*, 96: 810.

CHINN, H. I., *et alii* (1950*b*), "Antihistamines and Motion Sickness Prophylaxis", *Texas Rep. Biol. & Med.*, 8: 320.

CHINN, H. I., *et alii* (1951), "Further Studies of the Effectiveness of Various Drugs against Airsickness", *J. Aviation Med.*, 21: 535.

CHINN, H. I., and MILCH, L. J. (1952), "Effectiveness of Various Drugs in Prevention of Airsickness"; VII: Evaluation of Phenergan and Trimetron", USAF School of Aviation Medicine *Project No. 21-32-014, Report No. 7.*

CHINN, H. I., GANNON, W. R., and FRANTZ, M. E. (1953), "Prevention of Airsickness among Airborne Troops", *J. Appl. Physiol.*, 5: 599.

GAY, L. N. (1951), "A Subsequent Report on Dramamine", *Mil. Surgeon*, 108: 324.

GLASER, E. M., and HERVEY, G. R. (1951), "The Prevention of Seasickness with Hyoscine, Benadryl and Phenergan", *Lancet*, 2: 749.

GLASER, E. M., and HERVEY, G. R. (1952), "Further Experiments on the Prevention of Motion Sickness", *Lancet*, 1: 490.

HARPER, J. (1951), "Prevention and Treatment of Travel Sickness with Promethazine Chlorotheophyllinate", *Lancet*, 1: 1141.

LEDERER, L. G., and KIDERA, G. J. (1952), "Studies in Motion Sickness", an exhibit at the American Medical Association Annual Session.

MACKAY, R. A., and FERGUSON, J. K. W. (1951), "Influence of Certain Anti-motion-sickness Drugs on Psychomotor and Mental Performance", *J. Aviation Med.*, 22: 194.

MALCOCK, R., and MORANT, G. M. (1951), "Trials of Dramamine as a Preventive for Airsickness", R.A.F. Flying Personnel Research Committee Memo No. 20.

SOME CONSIDERATION OF MECHANISMS AND RATIONALE OF TREATMENT IN ANTE-PARTUM HÆMORRHAGE.[2]

By R. A. THATCHER, M.R.C.O.G.,

First Assistant in the Department of Obstetrics, University of Queensland.

IF we exclude cervical or vaginal conditions which cause bloody discharge in the last trimester of pregnancy, antepartum hæmorrhage refers to blood loss from the placental site after the twenty-eighth week. Edward Rigby, of Norwich, in 1775 described the condition as due to unavoidable or accidental circumstances. The term "accidental" is a poor one and in substance refers to any hæmorrhage from a normally situated placenta, whatever the cause. "Unavoidable hæmorrhage" was Rigby's term for hæmorrhage in *placenta prævia*.

In the majority of cases the cause of ante-partum hæmorrhage is unknown even after delivery. Within this group

[1] A tablet with this composition is marketed by Parke, Davis and Company under the proprietary name "Benacine".

[2] A post-graduate lecture, delivered at Brisbane, August, 1953.

may be some cases due to trauma, marginal sinus rupture, circumvallate placenta or even simple stripping of membranes. Toxæmia and hypertension are not very common associated conditions, but are the most dangerous concomitants. It is not known whether the toxæmia is the cause of the hæmorrhage; but such a relation is inferred from the relative frequency of the occurrence of ante-partum hæmorrhage in toxæmia and hypertension as opposed to normal pregnancy—that is, 1 in 18 as opposed to 1 in 133 in one series. The mechanism of such action is considered to be anoxic damage to terminal capillary beds following arteriolar spasm which occurs in hypertensive states. One additional factor of great importance is the already low placental reserve present, as shown by the recent investigation by Professor McClure Brown, using radioactive sodium.

The fœtal mortality rate associated with each group in one series recorded was as follows: 44% with associated toxæmia; 26% with associated hypertension; 10% with unknown causes; 7% with *placenta prævia*. This mortality rate depends on the following factors.

When toxæmia is present the placental reserve is proportionately low, and a small reduction in functioning placental tissue is sufficient to kill the fœtus. In addition, the bleeding commences at any part of the placenta from the centre to its circumference, and every drop of blood exuded assists in stripping up more placenta until the blood reaches the margin, escapes by stripping up membranes and is revealed by passage through the os. The blood may also be forced by irritated uterine action into the muscle of the uterus and embarrass uterine circulation through gross damage which is associated with Couvelaire uterus.

It is established that areas of bleeding into the appendages of the uterus and under the peritoneal coat occur in some cases quite unconnected with the original site of placental separation. This suggests a hæmorrhagic state.

In ante-partum hæmorrhage of unknown ætiology heavy losses occur, with Couvelaire effects on the uterus in some cases without any preceding or subsequent rise in blood pressure. The explanation of this is not known.

In *placenta prævia* the loss commences usually at the part of the placenta nearest the os. This leads to very early revealed hæmorrhage and no tendency to extend the stripping up process. The placental reserve in such cases is ample as a rule, and fœtal death, except in gross cases, is uncommon if adequate treatment is given.

In relation to this bleeding mechanism, in each case the effect of "Pitocin" injection should be understood.

Wherever uterine muscle has been damaged, atony of that section may be expected, and the surrounding unaffected muscle may be assumed to be inhibited or mechanically or neurologically embarrassed by the failure of intermuscular conduction. This undamaged muscle can be caused to contract by the use of "Pitocin", and if it does so contract, then the retroplacental blood is again put into a state of tension and forced further into the damaged atonic muscle with disastrous effect. Thus moderate damage is converted into severe damage. The criteria for evidence of uterine muscle damage may be tenderness of the abdomen overlying the uterus, or evidence of peritoneal irritation such as a rigid abdomen.

In central or marginal *placenta prævia* no good can come from "Pitocin" injections, as irregular uterine contractions will cause torrential hæmorrhage.

In lateral *placenta prævia*, when "Pitocin" is given the muscle action tends to thin out the lower segment and separate more placenta, converting a small separation into a gross one. It is a most unpleasant experience to see the dangerous condition which arises from such treatment, which leads to an otherwise unnecessary Cæsarean section.

In view of the difficulty in the diagnosis of these cases, it is possibly safer to avoid "Pitocin" induction of labour in ante-partum hæmorrhage. The exception is toxæmic accidental hæmorrhage of mild degree when *placenta prævia* has been excluded by full digital exploration of the lower segment.

The place of Cæsarean section (lower segment) in the treatment of central and marginal *placenta prævia* is well established. This applies most forcibly in all well-equipped and well-staffed institutions where blood transfusions and expert anæsthetic assistance are available. As it is possible for circumstances to exist in which such conditions are not available, so the danger of Cæsarean section increases, and methods such as bipolar version or internal version and the bringing down of a leg have their place; but the maternal morbidity and fœtal mortality will rise steeply.

For lateral *placenta prævia* there is no indication for Cæsarean section unless the unusual condition of uncontrollable hæmorrhage occurs prior to labour or during labour despite rupture of membranes.

In toxæmic ante-partum hæmorrhage we fortunately rarely need to interfere, because labour commences as soon as the patient's blood pressure is restored to a reasonable level. It is in cases in which labour does not commence that the danger lies. A further loss is likely, and the earliest possible emptying of the uterus is sought, consistent with safety.

1. Rupture of membranes with stretching of the cervix is often successful; but in some cases the hæmorrhage is excessive and Cæsarean section is required.

2. Cæsarean section, if undertaken, must be primarily for the mother's sake, and it must be realized that a fair proportion of such cases require hysterectomy. It is dangerous to perform the operation for the sake of the chance of a live child, as in severe ante-partum hæmorrhage the prognosis for the child is most gloomy even if the child is born alive.

The indication for Cæsarean section in ante-partum hæmorrhage associated with toxæmia is much clearer in the earlier and least severe hæmorrhage, when the risk of having to perform hysterectomy and of fœtal death is least.

It has been postulated that the incidence of cortical necrosis of the kidneys may be reduced by Cæsarean section at a reasonably early stage. This is possible if the operation is performed before gross shock has occurred, but it is doubtful whether it is valid after such shock has commenced.

Rupture of membranes in the treatment of lateral *placenta prævia* is not clearly discussed in the text-books. There is no place for rupture of the membranes before labour commences. It would be far safer when bleeding recurs to put the patient to bed, give her morphine and prepare to give her a blood transfusion if necessary. Rupture of the membranes is useful only when the uterus is actively forcing the fœtal head down into the lower segment and compressing the bleeding site—that is, during labour. A tight abdominal binder may be helpful, but is probably unnecessary in most cases.

ACUTE STAPHYLOCOCCAL ENTEROTOXIN FOOD POISONING IN A VICTORIAN TOWN.

By E. J. CROWE, O.B.E., L.R.C.P., L.R.C.S.I., D.P.H.,
District Health Officer, State Health Department, Melbourne.

THE explosive outbreak of staphylococcal food poisoning recorded in this paper is of interest, as it is believed to be the first in which phage typing has been used epidemiologically in Australia to trace the source and course of this type of mass infection. The summer climatic conditions in Victoria are favourable for the production of staphylococcal enterotoxin, but as staphylococcal food poisoning is not a notifiable infectious disease records of its incidence are not available.

The outbreak, which occurred towards the end of October, 1952, involved some 80 people, about 20% of those

who partook of lunch at the town's annual agricultural show. The symptoms, which commenced approximately three hours after lunch, included nausea, abdominal pain, diarrhœa, vomiting, and in the more severe cases cramp, collapse and cyanosis. At the peak of the outbreak observers described somewhat dramatically patients lying around the showgrounds, in the garden of the doctor's house and in the hospital compound, or vomiting from their cars into the street gutters. Many were given ambulant treatment (0·3 grain of morphine) and sent home, while others reported to their own doctors and hospitals in neighbouring towns. Of the 14 patients admitted to local hospitals, all responded to symptomatic treatment and recovered in forty-eight hours, the majority being better in twenty-four hours.

Food.

The catering for the annual show was undertaken by a voluntary ladies' committee, the members of which lived in a small town about 15 miles from the showgrounds. Menus for lunch and afternoon tea are shown below.

Luncheon.

Cold meats: mutton seasoned, mutton pickled, corned silverside, ox tongue, mashed potatoes.

Salad: beetroot (home grown and cooked), lettuce, tinned peas, oranges, boiled eggs, mayonnaise, cheese.

Sweets: wine trifle, jellied fruits, custard, cream.

Afternoon Tea.

Sandwiches: veal and tongue, pork sausage, corned beef.

Cakes.

Meat for lunch was supplied by the local butcher. He cooked a portion of this meat himself two days before the show; the remainder was cooked on the same day by various members of the ladies' committee. The cooked meat was retained overnight in their homes under a variety of conditions, but generally refrigerated, and returned to the butcher's freezer the morning prior to show day. That afternoon it was sliced in a clean meat slicer in the general store, wrapped in grease-proof paper, and returned immediately to the butcher's freezer.

Additional meat, consisting of veal and tongue, pork sausage and corned beef, was purchased from the local café and used as filling for sandwiches for afternoon tea. Members of the ladies' committee lunched off these latter meats and suffered no ill-effects. As far as could be ascertained, no person who had afternoon tea but not lunch was affected, so it would appear that this meat was not implicated.

The salad mayonnaise was made by various committee members with tinned sweetened condensed milk, or with cream purchased from the local butter factory. Cream from the same source was also used with the sweets. Milk was supplied by the local butter factory, and from cows on exhibit milked in the showgrounds. The mashed potatoes, to which milk and salt were added, were prepared the afternoon before the show, as were most of the trifles and custards. It is doubtful whether many of the puddings, the mashed potatoes, or the salad mayonnaise were refrigerated after preparation.

There are no records of temperature or humidity for the town during this period, but the local residents said that it was "hot and muggy". The butcher's freezer was functioning satisfactorily immediately prior to the show, and when I inspected it.

Investigation.

As a result of the appearance of reports of the outbreak in the metropolitan Press, an officer of the Department of Health telephoned the local medical officer of health, who confirmed that the details reported were substantially correct. I was on tour and did not arrive on the scene of the outbreak until forty-eight hours after its onset. The investigation was further complicated by the fact that no samples of suspected food or specimens of fæces or vomitus had been kept for examination. Case tracing was rendered difficult owing to the lapse of time, and to the fact that the majority of those infected were day visitors, as few of the local inhabitants had lunched at the showgrounds. On inspection of the showgrounds it was found that the dining and preparation rooms had been cleared and all food utensils washed. A mixed heap of waste food corresponding to that of the lunch menu was found near the boundary fence of the grounds; a composite sample of this waste food was taken for bacteriological examination. In the same heap there were some tins containing traces of peas, meat and fruit salad, which were also sent for examination. Samples of water from the roof tank in the preparation room, and of milk from the butter factory were also collected.

Rectal swabs were taken from the three patients whom it was possible to trace, and a wound swab for examination for staphylococci from a resident with an infected hand who had handled the milk. Nose and throat swabs were taken from all food handlers located—namely, members of the ladies' committee, the butcher and the storeman who had sliced the meat. Detailed histories were taken from food handlers with reference to the specific food items prepared or handled by them, and to the possibility of present or recent staphylococcal infection. Patients were questioned as to the food consumed by them; but the composite nature of the helpings implicated many common food items.

Discussion.

The dramatic onset of the symptoms, the incubation period of three or four hours, the twelve to thirty-six hours' duration of the illness, the typical signs and symptoms enumerated, and the rapid recovery without specific treatment would indicate that the outbreak was due to the ingestion of preformed toxin rather than to bacterial poisoning, with the probability that the agent was staphylococcal enterotoxin. In gross contamination of food by other bacteria such as streptococci, coliform bacilli, Proteus or *Clostridium welchii*, vomiting is not a cardinal feature, and the incubation period is longer.

Staphylococcal food poisoning results from the consumption of food contaminated by the toxin of certain types of *Staphylococcus pyogenes* when temperature and time (four hours or more) are favourable for this toxin production. The enterotoxin is extremely heat stable, but gradually loses its potency on prolonged cooking. It is thought that 40% of the population harbour *Staphylococcus pyogenes* in the nose, and a smaller percentage on the hands. The proportion that harbours enterotoxin-producing types is not known, but is thought to be low.

Bacteriological Investigation.

Nasal swabs from eight food handlers were examined and *Staphylococcus pyogenes* was isolated from three. Similar organisms were isolated from the wound swab of a milk handler, from one of the three patients from whom a rectal swab was taken, from the composite sample of waste food, and from an empty green-pea tin. No other pathogens were isolated.

Table I shows details of the laboratory findings, and of the staphylococcal typing.

Conclusions.

Phage typing showed that the staphylococcus isolated from the nose of a food preparer (FHW7) was identical with that isolated from the inside of an empty green-pea tin, from the rectal swab of a patient, and with a difference of one phage reaction from a composite sample of food. Dr. Phyllis Rountree, who carried out this phage typing, considers that these four strains are identical and responsible for the outbreak. If this is accepted, there is evidence that FHW7 (a food handler and staphylococcal nasal carrier) had ample opportunity for accidentally contaminating the various food items prepared and handled by her. It is conceivable that the empty green-pea tin was

UNIVERSITY OF MELBOURNE LIBRARIES

contaminated by the other waste food with which it had been in contact for two days. I am of opinion, therefore, that the outbreak was due to a coagulase-positive staphylococcal enterotoxin, the food being contaminated by FHW7, and that there were ample time and suitable temperature conditions for the development of this enterotoxin.

General Observations.

As the frequency of the occurrence of acute staphylococcal food poisoning is not generally realized, nor the nature of the pathological and gastroscopic picture appreciated, the following extracts from the literature may be of interest.

TABLE I.

Laboratory Findings and Phage Typing of Staphylococcus Pyogenes Isolated in All Cases.

Serial Number.	Specimen.	Category.	Phage Type.
FHW1	Wound swab	Handled milk	Not typable
FHW2	Milk	Milk	Not typable
FHW3	Nasal swab	Butcher	Not typable
FHW4	Composite sample lunch food	Food	7/47/47B/47C/47D/31B
W5	Inside of can of peas	Pea can	7/42B/47/47B/47C/47D/31B
FHW6	Nasal swab	Food preparer	Not typable
FHW7	Nasal swab	Food preparer	7/42B/47/47B/47C/47D/31B
PW8	Rectal swab	Patient	7/42B/47/47B/47C/47D/31B

Palmer (1951), on gastroscopic examination of 42 patients suffering from staphylococcal enteritis, demonstrated transient patchy mucosal hyperæmia, regional œdema, muscular irritability, erosions and patechiæ with a purulent exudate persisting for forty-eight hours. Gastric tissue biopsies in a series of cases showed short-lived pathological changes including extrusion of masses of glandular cells to the mucosal surface, with regeneration and a normal mucosa in forty-two hours from the onset of infection.

Milton Feig (1950) reported two related outbreaks following wedding breakfasts in which cold baked ham was thought to be implicated. In this series the percentages infected were 50·7 and 44·6 respectively of those exposed, the main incubation period was 3·35 hours, and the mean duration was 1·25 days.

Dack (1943) considers that there is an inverse relationship between the incubation period and the severity and duration of the attack.

Summary.

The investigation of an outbreak of staphylococcal food poisoning is discussed. By phage typing the infecting organism was traced from the nose of a food preparer to the food consumed, and recovered from the rectal swab of a patient.

Acknowledgements.

I am indebted to Dr. Stephen Ormerod, of the Public Health Laboratory, Melbourne, who prepared cultures of the original specimens; to Dr. Phyllis Rountree, of the Royal Prince Alfred Hospital, Sydney, who carried out the phage typing; to Mr. E. S. A. Wing, District Health Inspector, who assisted in the investigation; and to Dr. Kevin Brennan, Chief Health Officer, for permission to publish this paper.

References.

DACK, G. M. (1943), "Food Poisoning", Chapter V, University of Chicago Press.

FEIG, M. (1950), "Staphylococcal Food Poisoning", *Am. J. Pub. Health*, 40 : 279.

PALMER, E. D. (1951), "The Morphologic Consequences of Acute Exogenous (Staphylococcic) Gastroenteritis on the Gastric Mucosa", *Gastroenterology*, 19 : 462.

DIVERTICULITIS AND DIVERTICULOSIS, WITH A REPORT ON A RARE COMPLICATION.

By T. P. DEARLOVE,

Repatriation General Hospital, Springbank, South Australia.

THE original intention in the preparation of this paper was to present a rare case of diverticulitis complicated by a large single metastatic abscess in the liver.

It was then decided to extend the scope of the paper to include a brief review of the literature, particularly with reference to metastatic complications, and to review the findings recorded in approximately 7000 consecutive autopsies, with regard to the incidence of diverticulosis and diverticulitis in South Australia.

Although numerous series of figures have been recorded in the past, it must always be of interest to add to these, particularly when the series is large enough to lend itself to the drawing of some interesting conclusions. This analysis, as regards figures for the total incidence of diverticulosis, shows little difference from other published reports. However, the actual percentage occurrence for each age group is tabulated and considered in rather more detail than in most other articles.

The history of the subject has been very well written by many authors, good reviews having been published by Ochsner and Bargen, by Hurst and Rowlands, by Johnson, by Patterson and Marxer, and most recently and completely, by Patterson.

Hurst and Rowlands in 1925 recorded Cruveilhier's classic description written in 1849, and I think no apology is necessary for quoting this again after twenty-seven years.

> . . . it is among old men, and especially those who are subject to constipation, that one not infrequently finds between the bands of longitudinal muscle fibres in the sigmoid a series of small, dark, pear-shaped tumors, which are formed by hernias of the mucous membrane through the gaps in the muscular coat. . . .

Cruveilhier thus recognized not only the pathological appearances, but also the fact that diverticula are associated with constipation, and occur predominantly in the aged.

Hurst and Rowlands regard Habershon as being the first to publish a description of diverticula in English, in 1857.

I found in his 1878 edition of "Diseases of the Abdomen" that Habershon included this description in the chapter entitled "On Constipation", and regarded these "pouches" as being one of the six main causes of chronic constipation. He indexed the lesions under "pouches", not under "diverticula".

It appears that the term "diverticulosis" was coined about 1914, probably by de Quervain.

Incidence of Diverticulosis.

The subject material from which this analysis is made was taken from the medical and scientific archives of the (Royal) Adelaide Hospital, wherein are recorded the findings from about 6880 autopsies, performed during the years from 1920 to 1948. The age range of the subjects extends from twelve years to the "over nineties".

Although this article deals mainly with colon diverticulosis, it was decided to include brief references to the

incidence of duodenal and jejunal diverticula for the sake of interest and completeness. Throughout the series no diverticula of the ileum were found at all, and one only was noted in the stomach.

No particular reference will be made to the distribution of the lesions throughout the colon, as it was found to be similar to that reported by numerous other writers.

Table I lists the cases of diverticulosis found in each separate thousand autopsies, and Table II summarizes the results.

TABLE I.

Autopsies.	Number of Diverticula.					
	Duodenum.		Jejunum.		Colon.	
	Males.	Females.	Males.	Females.	Males.	Females.
First thousand ..	—	2	2	—	4	2
Second thousand	—	—	2	—	12	2
Third thousand	1	1	1	2	15	9
Fourth thousand	—	—	6	1	19	10
Fifth thousand ..	2	1	8	4	25	8
Sixth thousand	2	—	4	2	16	9
Seventh thousand	1	—	3	3	26	7

It will be noted that the figures for the first thousand autopsies are much lower than those for the later ones. As in other series which include examinations made years ago, this was due to a less meticulous search having been made of the descending colon and sigmoid in earlier years.

TABLE II.

Site of Diverticula.	Male Subjects.	Female Subjects.	Total in 7000.	Percentage Occurrence.
Duodenum ..	6	4	10	0·14
Jejunum	26	12	38	0·54
Colon	117	47	164	2·34

The figures in the last column of Table II represent the total percentage incidence of diverticulosis for the series.

The consensus of modern opinion places the incidence of diverticulosis, both by autopsy and by radiological examination, at about 5% (Sauer). The foregoing figures are lower and approximate more to those found by Kocour in a survey of a similar number of autopsies.

These total percentage figures are, I think, relatively meaningless, the exact incidence of diverticulosis for each ten-year age group, as shown in Table III, being more interesting.

In previous surveys the highest number of cases has been found in the fifty to sixty years age group, though Fifield placed his maximum occurrence in the sixty to seventy years group. Certainly, in Table III too, the largest number is in the sixty to seventy years age group; but this is obviously due to the larger number of patients of these ages coming to autopsy.

However, there is no doubt from the figures in Table III that the absolute incidence of diverticulosis increases directly with increasing age. This fact has not been stressed particularly in the past, though several writers have obviously surmised that such was the case. Telling and Gruner, in 1917, tabulated the probable incidence of diverticulosis in the surviving higher age groups with results which suggest similar but not identical conclusions. Their curve showed a pronounced drop in incidence between seventy and eighty years, then a pronounced rise again to ninety years. The Table III percentages probably represent the position more accurately.

Kocour calculated the incidence in age groups up to seventy years and over, with almost parallel results, and with an even higher percentage for (white) females aged seventy years and over (15%).

A knowledge of incidence is probably of academic interest rather than of clinical importance, but it may,

TABLE III.

Age Group. (Years.)	Number of Autopsies.	Number of Diverticula.	Percentage Incidence.
10 to 39	1589	1	0·06
40 to 49:			
Males	603	7	1·16
Females	369	2	0·54
50 to 59:			
Males	928	14	1·5
Females	459	9	1·95
60 to 69:			
Males	1148	44	3·8
Females	473	16	3·4
70 to 79:			
Males	761	38	4·99
Females	250	14	5·6
80 to 89:			
Males	193	15	7·77
Females	79	6	7·6
Over 90	18	2	11·0

nevertheless, have some bearing on the vexed question of ætiology. The earliest writers on the subject regarded diverticulosis as a cause of constipation. Later, the more favoured view was that constipation was the cause of diverticulosis. Many other theories have been advanced as to causation, but the present conception is most satisfactorily summed up by Neal, as follows:

> . . . the outstanding features of the formation of colon diverticula have to do with inherent weakness of the muscular walls, plus increased colonic pressure from constitutional or environmental causes.

From the conclusions drawn during this study, I would suggest that the process of aging, in individuals who have some inherent poorness of quality of the bowel musculature, plays the most important role in the production of colon diverticulosis. I believe that diverticulosis is a degenerative disorder, and that it is analogous to the other so-called degenerative diseases. This notion, in fact, was first advanced by Hansemann in 1896.

Multiple Gastro-Intestinal Diverticulosis.

Coexisting jejunal and colon diverticulosis was found in seven cases, and in two cases diverticula of duodenum, jejunum and colon were present (one of the last-mentioned subjects being a female, aged ninety-two years).

Minimum Age Limit.

Throughout this series only one case of diverticulosis was found in a person aged under forty years (thirty-eight years). This has been the constant finding in all comparable series. Diverticula occurring in younger persons are probably congenital in origin—the "true diverticula" of the older writers. Arnheim recorded a case of acute diverticulitis in a very young infant.

Sex Incidence.

Although the percentage of males affected in the forty to fifty years age group was double that of females, the sexes were about equally affected throughout the higher ages.

Diverticulitis.

Of the 10 duodenal diverticula, one was found to be closely associated with a duodenal ulcer, and appeared to have been involved in the inflammatory process surrounding this. The other nine appeared not to have been affected by any pathological process.

In the 38 cases of jejunal diverticulosis described, there was no evidence at autopsy to suggest that any of these had been involved in abnormal pathological processes during life. Such a finding is, on the whole, in agreement with other published opinions. Telling and Gruner believed that only one case of acute jejunal diverticulitis had been reported up to 1917, though recent writers have shown that the condition is rather more common.

Diverticulitis of the Colon.

Of the 164 cases of diverticulosis of the colon in this survey, it was found that death was caused directly by, or materially contributed to, by severe diverticulitis in 22 cases. Perforation with acute generalized peritonitis accounted for 16 of the 22 deaths. Of the six remaining cases, significant autopsy findings were as follows:

CASE I.—In an enormously fat woman, aged seventy-two years, was found a large abscess occupying nearly the whole of the left iliac fossa, and arising from a perforated sigmoid diverticulum. A secondary infection with *Clostridium welchii* had occurred, and the resultant serum and gas had appeared in the anterior abdominal wall and in the tissues of the upper part of the thigh.

The underlying pathological lesion in this subject (which was examined about thirty years ago) was not diagnosed prior to death. In some ways this case may have been rather similar to the two interesting cases of diverticulitis complicated by surgical emphysema reported by Dawson and Hardy.

CASE II.—In a man, aged ninety-five years, was found an ulcerative colitis-like condition of the large bowel, with extensive inflammation of coexisting diverticula in the sigmoid.

CASE III.—In a man, aged forty-five years, abscess formation had occurred about some sigmoid diverticula, with pylephlebitis and an abscess below the right lobe of the liver, but not in the liver.

CASE IV.—In a woman, aged sixty-five years, an abscess about five inches long surrounded a perforated diverticulum of the splenic flexure. The abscess cavity contained tomato skins and other little-digested food residue. The immediate cause of the death of this woman was put down to inanition and cardiac failure.

This was the only case in the series in which a diverticulum in a situation other than the sigmoid colon was affected by pathological changes.

CASE V.—In a man, aged forty-three years, a small walled-off abscess was found surrounding a sigmoid diverticulum, with adhesions to the small bowel resulting in kinking and partial obstruction of the ileum.

CASE VI.—In the final case there was extensive peri-diverticulitis with considerable thickening of the sigmoid wall and narrowing of the bowel lumen.

In addition to the foregoing there were three cases in which a small amount of adhesion was present between diverticula and adjacent structures, suggesting that mild acute diverticulitis had existed at some time during life, and in two other cases the pathologist considered the walls of the diverticula to be thickened from the same cause.

In these last-mentioned five cases, however, the condition appeared to be old, and obviously had no relation to the ultimate death of the patient.

Although the hospital files for Cases I to VI were not available, it appeared, from the brief clinical notes provided for the autopsies, that the diverticulitis in several of the cases was not suspected prior to death.

Death Rate from Diverticulitis.

In this series 13·4% of the diverticulosis sufferers ultimately died from the effects of acute diverticulitis, and of the 164 subjects, 9·7% died from acute peritonitis following rupture of a diverticulum.

Evidence of diverticulitis at some time during life was noted in a total of 27 cases or 16·5% of the diverticulosis cases. This figure is reasonably similar to those published by Rankin and Brown (17%), by Mayo (12%), by Ochsner and Bargen (11%), by Horner (23%), by Brown (25%), and by Willard and Bockus (22%). Willard and Bockus considered that "the probability of occurrence of diverticulitis was in direct proportion to the number and size of the diverticular pouches". This seems a reasonable concept, though I do not think any such specific conclusion could be reached from the data at my disposal.

The total percentage occurrence of diverticulitis for this series of 7000 adult subjects was 0·38%. This coincides very closely with Graham's figure of 0·4% (quoted by Smithwick, 1942).

Age Incidence of Deaths from Diverticulitis.

Table IV shows the distribution in the various age groups of the 22 cases in which death resulted. The percentage death rate for diverticulitis complicating diverticulosis in each ten-year age group is shown in the last column in each case.

TABLE IV.

Age Group. (Years.)	Total Diverticulosis.	Total Deaths.
10 to 39 ..	1	Nil
40 to 49 ..	9	4
50 to 59 ..	23	4
60 to 69 ..	60	7
70 to 79 ..	52	6
80 and over ..	23	1

Although 22 cases are far too few for any hard and fast conclusions to be drawn, the remarkably high death rate in the forty to forty-nine years group, and, to a less extent, in the fifty to fifty-nine years group, when compared with the overall percentage of 13·4, seems to call for some comment.

I have noticed in the literature on diverticulitis rather a surprising number of severe cases falling in the younger age groups. For instance, in Arnheim's article, one finds the average age of a group of 18 subjects (excluding a very young infant) with acute diverticulitis requiring surgical intervention to be 51·5 years, whilst in 16 cases of a milder degree not requiring surgical intervention the average was 68·8 years.

One is inclined to think that those people who show diverticulosis in the early forties are more likely to fall a victim to acute diverticulitis, than are the more elderly.

Chronic Diverticulitis.

Is chronic diverticulitis a disease entity?

This study is based on pathological, not clinical, findings, and a discussion on symptomatology would be out of place. Nevertheless, there are some points of interest pertinent to the foregoing question which arise out of the survey. It has been the general opinion, in the last fifty years, that diverticulosis of the colon, *per se*, is a symptomless disorder. Ochsner and Bargen stated that "although diverticulosis itself is essentially an innocuous lesion, it appears to suggest a potential danger which should not be overlooked".

Most text-books will be found to contain some reference to "chronic diverticulitis", and one often notices that various vague intestinal symptoms are attributed to this cause, should the patient happen to exhibit the pouches when a routine barium enema X-ray examination is carried out. One feels that at times this is due to an inadequate assessment of the case as a whole, and that the diagnosis

"chronic diverticulitis" in such cases is invoked in much the same relatively empirical way as are so many other chronic "itises", such as tonsillitis, gastritis, cholecystitis and appendicitis, to explain vague gastro-intestinal symptoms. (No doubt one will be able soon to add chronic pancreatitis to this list.) Probably some lack of clarity on the subject will exist until practitioners make a more precise distinction between true chronic inflammatory processes on the one hand, and the sequelæ of mild acute inflammatory episodes on the other.

Although microscopic examination was not carried out in any of these autopsies, the macroscopic examination did not, in any case, suggest that a chronic proliferative inflammatory process had been present during life.

I think that true chronic diverticulitis is as rare as true chronic appendicitis.

Occurrence of Metastatic Abscess Complicating Diverticulitis.

I have not reviewed the entire literature on the subject by any means; but what I have read confirms the impression that metastatic abscess is a complication of considerable rarity.

Telling, in his masterly article on diverticulitis in 1908, reviewed the entire literature to that date, and noted only one recorded case of metastatic abscess, that recorded by Whyte in 1906. This occurred in a man, aged sixty-five years, stout, and not abstemious, who suffered from rigors and fever for some time prior to death. An ante-mortem diagnosis was not established. The relevant autopsy findings were as follows:

> . . . There was an abscess cavity the size of a thrush's egg in the wall of the sigmoid surrounding a diverticulum. There were multiple abscess cavities throughout the liver and no evidence of pylephlebitis. . . .

This account is interesting, as the case is similar to the one to be described in this paper.

In 1917 Telling and Gruner again reviewed the relevant literature, and still regarded Whyte's case as the only one of its type on record.

In 1921 Foggie reported the case of a woman, aged eighty years, with metastatic abscesses in lung and brain, secondary to suppurating diverticulitis. He reviewed the literature, could find no case other than Whyte's reported, and considered his case therefore to be the second on record.

In 1926 Kramer and Robinson reported the case of a Negro, aged sixty-eight years, who suffered for three weeks from pyrexia and rigors, nausea and vomiting, and right upper quadrant pain. Leucocytosis and an enlarged, tender liver were noted, and a growth of *Streptococcus viridans* was obtained on blood culture. No definite diagnosis was established prior to death. The autopsy revealed the following findings:

> . . . multiple fæcal impacted diverticula of the colon and sigmoid. Suppurative diverticulitis with huge intramural abscesses of the colon and sigmoid. Suppurative phlebitis of the mesenteric, splenic, and portal veins. Suppurative cholangitis and hepatitis, and multiple abscesses of the liver. . . .

Kramer and Robinson believed this to be the third such case on record.

Arnheim, in 1940, after a review of the literature, noted the three cases of metastatic abscess already described, but no others. I have studied several articles published in the past ten years without finding any new reports of such cases. There is very little detailed information on the condition in standard text-books and medical encyclopædiæ.

Report of a Case.

A foreman stevedore, aged fifty-four years, was admitted to hospital under my care in October, 1952. The complaint immediately leading to his admission to hospital was that of having vomited changed blood, one specimen of which was inspected (and verified) by his own doctor. The patient gave the following history. He had been discharged from the armed forces in 1945 as medically unfit because of hypertension and myocardial fibrosis. In 1951 he awoke one morning to find that he had a paralysed left leg and a weak left arm. This recovered quickly, except that a left foot-drop remained. He has since worn, and been satisfied with, a "spring-toe" boot. For some three to four years he had been prone to become breathless on exertion, and at times had had attacks of pain in the central area of the chest, which usually, but not invariably, were brought on by exertion. The pain had spread to the left elbow and fingers, and always passed off quickly with cessation of exertion. During the six months prior to his admission to hospital, he thought the foregoing attacks had been rather more easily induced. He had also noticed some falling off in the keenness of his appetite, and thought that his weight had dropped by about 14 pounds. For years he had been mildly constipated, but there had been no recent change in his bowel habits, nor in the appearance of the motions. His digestion had been good, and he had had no abdominal pain. Early morning cough with phlegm had been a long-standing complaint, but on each of the three mornings prior to his admission to hospital the cough had caused nausea and retching followed by vomiting, and on each occasion the vomitus had contained "a lot" of dark brown blood. Other than this, his recent state of health had not caused him any real concern. He had been in the habit of smoking 15 to 20 cigarettes a day, and had always been a beer-drinker in moderation. Three days prior to his admission to hospital he had attended a party and become comfortably intoxicated.

Clinical examination of the patient at the time of his admission to hospital revealed him to be a short, broad, powerfully built man, looking about fifty years of age. His (normally ruddy) face looked a little pale, but he was not distressed and not shocked. His temperature was 98° F., his pulse rate was 110 per minute, and his blood pressure was 110 millimetres of mercury, systolic, and 70 millimetres, diastolic. (This had been recorded as 200 millimetres of mercury, systolic, and 100 millimetres, diastolic, two years previously.) The heart was not enlarged, and the rhythm was regular. There was an aortic systolic bruit, but no thrill. The abdomen was obese, the liver and spleen were not palpable and no evidence of abdominal abnormality was found. Left foot-drop was present. Digital examination of the rectum did not suggest anything unusual, and the fæces on the glove were not melænatous. Clinical examination of the other systems gave negative results. The hæmoglobin value was 9·6 grammes per 100 cubic centimetres. An electrocardiographic tracing revealed no obvious abnormality. A provisional diagnosis was made of hæmatemesis, from either a gastric erosion or a "silent" gastric ulcer, and conservative therapy was carried out.

The clinical course was uneventful for three weeks, at the end of which time the hæmoglobin value had risen to 13·5 grammes per 100 cubic centimetres, and the patient felt perfectly fit. At this stage a barium meal X-ray examination revealed no abnormality of the œsophagus, stomach or duodenum; the chest X-ray film was clear, and a gruel fractional test meal examination gave normal results. A blood examination revealed a hæmoglobin value of 13·5 grammes *per centum* and a leucocyte count of 9600 per cubic millimetre, and a differential leucocyte count gave normal findings. The blood did not react to the Wassermann test or the Kline test.

The patient went out on leave prior to being discharged from hospital, but returned feeling feverish (temperature 100° F.) and complaining of aching limbs. The symptoms subsided in three days, and were thought to be due to a mild upper respiratory tract infection, which was prevalent at the time. Three days after this attack subsided, he again complained of feverishness, lassitude and dull aching pain in the chest, and had a mild rigor, when his temperature rose to 101° F. This fever continued, with mild daily rigors, till death occurred eighteen days later.

Up to the day prior to his death the patient complained of no specific symptoms other than those of discomfort during the daily rigor, and his appearance was not such as to give rise to grave concern. Numerous investigations were carried out in an attempt to trace the cause of the fever. A leucocytosis of 16,000 to 18,000 per cubic millimetre developed and persisted; chest and abdominal X-ray examinations repeatedly gave normal findings, several attempts at blood culture failed to yield any growth of microorganisms, and repeated microscopic examination of the urine revealed no abnormality.

In view of the persistent rigors and leucocytosis, it was considered that "pus" almost certainly was present somewhere—either in the lungs, under the diaphragm, or in the kidney region. However, repeated radiological examination gave negative findings, and the patient was not able to help by producing any localizing pain or other symptoms.

Quite suddenly, about seventeen days after the onset of the fever, he complained of breathlessness and tightness in the chest, and passed several small watery motions in quick succession. He appeared cyanosed, had a pulse rate of 150 per minute and a respiratory rate of 40 per minute, and shortly afterwards became semi-comatose. I was called to see him later that day (I had not been looking after him during the preceding ten days), and found that he was semi-conscious, cold, clammy, and sweating, with a pulse rate of 160 per minute, a respiratory rate of 50 per minute, a temperature of 104° F., and a blood pressure of 50 millimetres of mercury, systolic, and 10 millimetres, diastolic. An electrocardiogram taken earlier the same day revealed a very rapid rate, but no evidence of coronary infarction.

I considered that he must be suffering from acute toxic myocarditis, and postulated pneumonia, possibly Friedländer in type, as the basis, though admittedly there was little enough abnormality in the chest by way of localizing signs.

Respirations ceased shortly afterwards.

During the course of the illness he was treated with penicillin, then aureomycin, but without any appreciable effect on the fever.

Autopsy was performed about ten hours after death by Professor J. B. Cleland. The following are the relevant details.

The bronchi were a little congested with mucopus; some congestion and œdema of the lung bases and some emphysema were present.

The heart weighed 16 ounces. The anterior and right posterior cusps of the aortic valve were adherent and calcified, the commissure was much reduced. The coronary orifices were patent, and some atheroma was present in the coronary arteries. The heart muscle was of good colour and firm texture.

In the œsophagus, stomach, duodenum and small intestine the mucosa was normal throughout.

The suprarenals appeared normal, and there was no evidence of hæmorrhage.

In the colon, about the junction of the descending colon and the sigmoid, there were a number of adhesions and loculi, apparently from one or two distended diverticula; there was much induration round several discoloured, foul abscess cavities, and adhesions extended to loops of the ileum.

The liver weighed 95 ounces. In the left lobe was a foul abscess cavity, rather loculated, about two and a half inches in diameter, and lined by a pyogenic membrane.

The cause of death was considered to be the toxic effect of the liver abscess and the abscesses round the diverticula.

Discussion.

There is no doubt that the cause of death was as stated in the autopsy summary, though the immediate mode of death, in view of the appearance of the patient as I saw him, I believe was cardio-vascular failure due to acute toxic myocarditis. This, in itself, is unusual these days, though it was a dreaded complication of pneumonia less than two decades ago.

Diverticulitis and liver abscess were not considered in the differential diagnosis during life. It is rather galling to think that two such obvious conditions were present and not even suspected. Yet, when the clinical side was reviewed again, there were no clinical signs other than the leucocytosis which might have acted as useful guides. There were no unusual bowel symptoms prior to the day of death; there was no pain or mass or tenderness in the left side, and no appreciable enlargement or soreness of the liver. A barium enema X-ray examination would, I think, have revealed a filling defect and would probably have led to an exploratory laparotomy; but unfortunately there did not appear to be any indication to make such an examination.

The hæmatemesis, which was the original reason for the patient's admission to hospital, presumably came from an acute gastric erosion (there was no post-mortem evidence of portal hypertension), and must have been a purely fortuitous cause of his admission.

For approximately seven years the patient had been thought to have myocardial fibrosis, and he certainly suffered periodic attacks of pain, the description of which strongly suggested cardiac ischæmia. The autopsy showed that the pain was not due to coronary artery occlusion, or to permanent narrowing of the lumina of the vessels. Had this, in fact, been the cause, then one would have expected an increase in frequency of the painful episodes during the period of anæmia and relative hypotension, which lasted for several days.

The attacks of angina, then, may have been true cardiac pain resulting from coronary spasm, or they may have been œsophageal or gastro-intestinal in origin (Evans).

The aortic valvular lesion, considered to be aortic stenosis secondary to sclerosis during life, was confirmed at autopsy.

It is interesting to speculate on how long the abscesses had been present prior to the patient's death. One would have thought, from the post-mortem appearances, that they had been in existence for several weeks.

Conclusions.

In the three cases collected from the literature, and in the one reported above, the presenting symptoms in each were unexplained pyrexia, rigors, and (generally) leucocytosis. In each case the localizing signs were insufficient to establish a diagnosis during life.

In the autopsy survey also it was found that localized abscess complicating diverticulitis occurred several times, and, although it was unsuspected by the clinician, it must have had a considerable influence on the outlook of the patient.

Though admittedly the condition is rare, it would appear that in those cases of intractable "pyrexia of unknown origin" with which we are all occasionally faced, consideration should be given to the possibility of diverticulitis and its complications as a causative factor.

Summary.

1. Cruveilhier's classical description of diverticulosis of the colon is quoted.

2. The incidence of diverticulosis in 7000 consecutive autopsies performed in South Australia is reviewed.

3. The percentage occurrence for each ten-year age group is tabulated. It is shown that the incidence of diverticulosis increases from 0·8% in the forty to forty-nine years age group to 7·7% in the eighty to eighty-nine years group, and up to 11% in the "over 90's".

4. The possible relationship of these findings to the question of ætiology is discussed.

5. Of the 164 subjects of colon diverticulosis, 22, or 13·4%, died from the effects of acute diverticulitis, and a further five exhibited evidence of previous healed acute diverticulitis. These cases are discussed in some detail, and the age incidence of deaths is tabulated.

6. The literature on metastatic abscess complicating diverticulitis is surveyed, and a new case is recorded, in which there was a large single metastatic abscess of the liver.

Acknowledgements.

I wish to thank the chairman of the Repatriation Commission for permission to publish the details of the case report. My grateful thanks go to Professor J. Burton Cleland for assistance and encouragement in the survey of the autopsy records.

References.

ARNHEIM, E. E. (1940), "Diverticulitis of Colon, with Special Reference to Surgical Complications", *Ann. Surg.*, 112 : 352.

DAWSON, R. L. G., and HARDY, R. H. (1948), "Diverticulitis Presenting as Emphysematous Cellulitis of Leg", *Brit. M. J.*, 1 : 498.

FIFIELD, L. R. (1927), "Diverticulitis", *Lancet*, 1 : 277.

FOGGIE, W. E. (1921), "Diverticulitis with Matastatic Suppuration", *Lancet*, 1 : 1357.

HABERSHON, S. A. (1878), "Diseases of the Abdomen", Churchill, London.

HORNER, J. L. (1952), "A Study of Diverticulitis of the Colon in Office Practice", *Gastro-Enterology*, 21 : 223.

HURST, A. F., and ROWLANDS, R. P. (1925), "Diverticula of the Colon", *Guy's Hosp. Rep.*, 75 : 462.

JOHNSON, T. A. (1944), "Colonic Diverticula", in Bockus, H. L., and others, "Gastro-Enterology", Saunders, 2 : 674.

KOCOUR, E. J. (1937), "Diverticulosis of Colon; Its Incidence in 7,000 Consecutive Autopsies with Reference to its Complications", *Am. J. Surg.*, 37 : 433.

KRAMER, S. E., and ROBINSON, W. (1926), "Acquired Suppurative Diverticulitis with Pylephlebitis and Metastatic Suppuration in the Liver", *Surg., Gynec. and Obstet.*, 42 : 540.

"Medical and Scientific Archives of the (Royal) Adelaide Hospital", Volumes 1 to 3.

NEAL, J. W., junior (1951), "Diverticulitis of the Colon and its Surgical Management", *Surg.*, 30 : 606.

OCHSNER, H. C., and BARGEN, J. A. (1935), "Diverticulosis of the Large Intestine; An Evaluation of Historical and Personal Observations", *Ann. Int. Med.*, 9 : 282.

PATTERSON, S. W. (1950), "The History of Diverticulitis of the Intestine", *Proc. Roy. Soc. Med.*, 43 : 785.

PATTERSON, S. W., and MARXER, O. A. (1950), "Diverticulosis and Diverticulitis", in British Encyclopædia of Medical Practice, 4 : 449.

SMITHWICK, R. H. (1942), "Experiences with the Surgical Management of Diverticulitis of the Sigmoid", *Ann. Surg.*, 115 : 969.

TELLING, W. H. M. (1908), "Acquired Diverticula of the Sigmoid Flexure, Considered Especially in Relation to Secondary Pathological Processes and their Clinical Symptoms", *Lancet*, 1 : 843 and 928.

TELLING, W. H. M., and GRUNER, O. C. (1917), "Acquired Diverticula, Diverticulitis, and Peridiverticulitis of the Large Intestine", *Brit. J. Surg.*, 4 : 468.

WILLARD, J. H., and BOCKUS, H. L. (1936), "Clinical and Therapeutic Status of Cases of Colonic Diverticulosis Seen in Office Practice", *Am. J. Digest. Dis.*, 3 : 580.

Reports of Cases.

INDOLENT CUTANEOUS ULCERATION DUE TO INFECTION WITH MYCOBACTERIUM ULCERANS.

By B. R. V. FORBES, J. S. WANNAN and the late W. B. KIRKLAND,

School of Public Health and Tropical Medicine, University of Sydney.

CHRONIC ULCERATION of the skin due to infection by a species of mycobacterium of unique cultural and pathogenic behaviour was reported in Victoria by MacCallum, Tolhurst, Buckle and Sissons (1948). The name *Mycobacterium ulcerans* has been proposed for this micro-organism (footnote to Fenner, 1950).

Seven cases in Sweden of similar clinical pattern were described by Gellerstedt (1944). Mycobacteria were identified in lesions, but cultural and animal pathogenicity tests were unsuccessful. In the same year, Englund and Wahlgren (1944) reported two cases of dermatosis apparently due to infection with mycobacteria. These microorganisms were not isolated in culture, and infection was not established in experimental animals.

Subsequent to the identification of human infection by *M. ulcerans* in Victoria, the case described in this paper was investigated and reported briefly by the present authors (Forbes, Kirkland and Wannan, 1950).

Van Oye and Ballion (1950) described a similar clinical picture in a child of American parentage infected in the Belgian Congo. Janssens (1950), in a discussion of the paper by these authors, reported a series of 81 patients in the Belgian Congo who, very probably, had suffered an infection of the same nature. Further investigation and treatment of this patient were undertaken in New York (Meleney and Johnson, 1950, 1951).

Nordén and Linell (1951) described some 70 cases of chronic papular skin disease in Sweden. Mycobacteria of unusual biological behaviour were isolated from lesions. Some of the patients had suffered scratches in a swimming pool two or three weeks prior to the onset of disease. Mycobacteria, identical with those isolated from human lesions, were found in water from the pool and in scrapings from its cemented walls. The authors considered that this microorganism was not identical with *M. ulcerans*. In a later publication Linell and Nordén (1952) suggested the name *M. balnei* for this acid-fast bacillus.

CLINICAL RECORD.

The patient, a male, aged forty years, was by occupation a wharf labourer. He had visited New Guinea, periodically for two and a half years, prior to development of an ulcer on the lateral aspect of the lower third of his left leg. The ulcer appeared about five months subsequent to his last visit, whilst he was resident in Sydney, where he had lived for an otherwise uninterrupted period of twenty-two years. The lesion came under our notice some two years later. During the interim it had been treated solely by local applications. The patient stated that ulceration was preceded by slight abrasion of the skin surface. Serological tests for syphilis, made on three occasions, had returned negative findings.

FIGURE I.

At the time of examination a large ulcer was present on the lower part of the left leg, extending for a distance of about 10 centimetres proximal to the lateral malleolus. Ulceration and repair were proceeding concurrently, and there were six discrete areas of ulceration, each with serpiginous outline, separated by slender epithelial bridges. The largest of these areas measured 3·0 by 1·8 centimetres in its greatest diameter (Figure I). The multiple ulcers had no doubt spread from a single site by the undermining of skin in several directions. Where reparative change had occurred, dense scarring and bronze-coloured pigmentation had resulted. The skin margins were deeply undermined, and the surfaces of the ulcerated areas were covered with either frank slough or unhealthy-looking granulation tissue. Regional lymph nodes were not involved.

Numerous acid-fast bacilli were observed in scrapings from the undermined edges of the lesions and in tissue sections. Material from the ulcer was seeded on a variety of bacteriological media, which were incubated aerobically and anaerobically. No spirochætes were observed on dark-ground examination of wet films from the lesion. The patient gave a positive response to the Mantoux test with old tuberculin (one in 1000). X-ray examination of his chest revealed no abnormality. Clinical examination showed no evidence of neural involvement or other indication of leprosy.

The ulcerated area was excised and the leg was immobilized in a plaster cast. Healing occurred, apart from a small area from which acid-fast bacilli were recovered in culture, and which persisted for some six months before healing. The organism appeared sensitive in vitro to "Sulphetrone", and treatment with this drug was commenced, an initial dosage of 1·5 grammes daily being increased by increments to six grammes daily over a period of six weeks. After a rest interval of a month, treatment was resumed for a period of an additional four weeks.

In the meantime in an area of skin (A, Figure II) which had suffered pressure from the plaster cast, there developed a small undermined ulcer, from which acid-fast bacilli were recovered in culture. "Sulphetrone" therapy was continued, but acid-fast bacilli persisted. The sodium salt of *p*-amino salicylic acid was applied locally in 20% solution. Smears and cultures from the ulcer became "negative" within a week. The ulcer healed firmly two months later. Healing had been delayed, at least in part, by an intercurrent staphylococcal infection.

A nodule (B, Figure II) situated on the distal portion of the dorsum of the left foot, which had been present for some months, now showed evidence of activity and became ulcerated. This lesion later responded to excision.

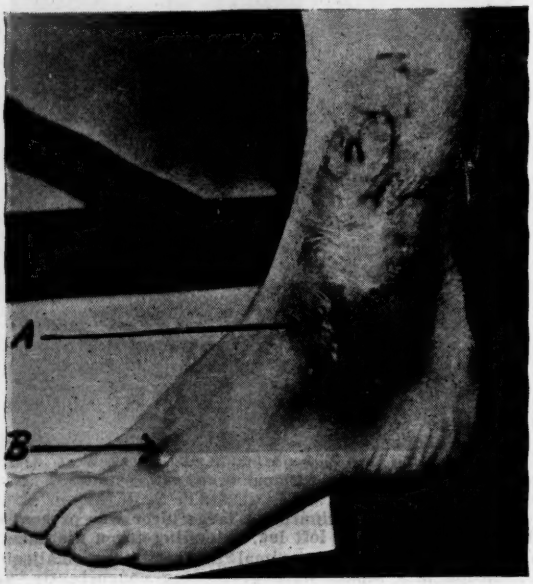

FIGURE II.

BACTERIOLOGICAL INVESTIGATION.

Direct Microscopic Examination.

Acid-fast bacilli were demonstrated on numerous occasions in direct smears from the ulcer and in biopsy specimens. The organisms occurred singly or in bundles, individual cells frequently lying in parallel. They were slender rods, straight or slightly curved with rounded ends, and occasionally showed granular staining resembling *M. tuberculosis*.

Culture.

Material from the lesion was seeded on the following media: nutrient broth; nutrient agar; Robertson's cooked meat; Sabouraud's glucose agar; blood agar; Dorset's egg medium, with and without glycerin and Löffler's inspissated serum. The inoculated media were incubated aerobically at room temperature (about 20° to 25° C.) and at 37° C., and anaerobically at 37° C. *Staphylococcus albus* and a saprophytic Gram-positive bacillus were grown in aerobic culture. Neither fungi nor anaerobes of any species were isolated.

In addition, slopes of egg-yolk agar were inoculated and incubated at 30° to 33° C. and at 37° C. No growth appeared on medium incubated at the latter temperature. However, at 30° to 33° C., growth was apparent after eight weeks' incubation, when small, discrete, translucent colonies about 0·2 millimetre in diameter were observed. Later the colonies became whitish and the average diameter increased to one millimetre. They could be emulsified readily in saline.

On microscopic examination the acid-fast rods, of which these colonies consisted, were short, relatively thick and uniform in size. No beaded, branched or filamentous forms were seen.

In subculture, the organisms were readily cultivable on Löwenstein-Jensen egg medium. Growth appeared in about four weeks, and colonies early assumed light yellow pigmentation. Subculture was not inhibited by the glycerin in Löwenstein-Jensen medium, which, on the contrary, appeared to enhance growth by the evolution of colonies of larger size.

Diffuse growth was obtained in about two weeks on subculture in both Long's fluid medium (containing "Tween 80") and Dubos's fluid medium. Subcultures on Dubos's oleic acid-albumin agar showed growth in about three weeks after inoculation.

Bacterial Sensitivity Tests.

Sensitivity of the mycobacterium was investigated in respect of streptomycin, penicillin, "Sulphetrone" and *p*-amino salicylic acid, incorporated in both solid and liquid media.

The organism exhibited approximately the same degree of sensitivity to streptomycin as the H37 Rv strain of *M. tuberculosis*.

The organism was not sensitive to penicillin.

Growth of the organism failed to appear in media containing one milligramme *per centum* of "Sulphetrone" or *p*-amino salicylic acid.

Animal Pathogenicity Experiments.

Guinea-Pigs.

Six guinea-pigs were inoculated with material obtained by curettage of the patient's ulcer, three by the intramuscular, three by the intraperitoneal route. The animals were sacrificed at intervals over a period of four months. At post-mortem examination there was no macroscopic or microscopic evidence of a pathological process in any animal.

Similarly, six guinea-pigs were inoculated, three by the intramuscular, three by the intraperitoneal route, with a heavy suspension of organisms prepared from the primary egg-yolk isolate. No post-mortem evidence of infection was found in animals killed over a period of twelve months.

Mice.

Two male mice were inoculated intraperitoneally, each with 0·5 millilitre of culture suspension. A few months after inoculation the mice developed generalized subcutaneous œdema, and both died six to eight weeks later. No effusion was observed in the peritoneal or thoracic cavities, and the serous membranes appeared normal. Scanty acid-fast bacilli were found in the subcutaneous tissue of both mice and in smears from the liver and testis of one animal.

Rats.

Six male rats were inoculated intraperitoneally with acid-treated material from the patient's ulcer. Four to six months subsequently, swelling of the scrotum and subcutaneous œdema occurred in varying degree. At autopsy, gelatinous subcutaneous exudate of the scrotum and the

lower part of the abdomen was observed. The viscera were congested and sanious exudate was present in the pleural and peritoneal cavities. Smears prepared from exudates showed acid-fast bacilli, occurring singly and in bundles. The organisms were recovered in culture on egg-yolk medium. Material from lesions of these rats was passaged in a further series of three male rats, with similar result.

One male rat was inoculated subcutaneously in the middle third of the tail with material from the patient's ulcer. After about four weeks, ulceration appeared at the site of inoculation, extended proximally and distally and resulted ultimately in complete separation of the tail near the site of inoculation. The animal was sacrificed after being kept under observation for twelve months, but, apart from the local lesion, no pathological changes were found *post mortem*.

A culture suspension was injected, subcutaneously, into the tails of an additional three white rats. Two of these died within a period of a few months from causes unrelated to the investigation. The third rat developed ulceration of the tail (Figure III) two months after inoculation. Acid-fast bacilli were demonstrated in smears from the lesion and recovered in culture. Six months after inoculation the rat died, and clear straw-coloured effusion was found in both pleural and peritoneal cavities. Acid-fast bacilli were present in both exudates; but otherwise no macroscopic or microscopic abnormality was detected.

Acid-treated material from the tail lesion of the rat described in the foregoing paragraph was passaged intraperitoneally in two male rats. One rat developed ascites and œdema of the scrotum four months later and died shortly afterwards. Post-mortem examination revealed gelatinous exudate in the scrotal tissues and blood-stained pleural and peritoneal effusions. Viscera and serous membranes in the abdomen and thorax were much congested. Acid-fast bacilli were observed in smears from the effusions, scrotum, testes, liver and spleen, and were recovered in culture from all sites. Four months after inoculation the remaining rat showed infiltration of the scrotal tissues, mainly on the left side. A month later the animal died.

Possums.

Backhouse and Bolliger (1951) noted that the normal temperature of the possum (*Trichosurus vulpecula*) is lower than that of the higher mammals, generally between 95° and 96° F., and in a few animals as low as 92° F. For this reason it was considered that the possum might be a useful experimental animal. The findings hereunder were reported briefly in an earlier publication (Bolliger, Forbes and Kirkland, 1950).

Series A.—A male possum (439) was inoculated, in the left thigh, with acid-treated material from the patient's ulcer. About four months later an indurated lesion appeared at the site of inoculation, and ulceration occurred shortly afterwards (Figure IV). Acid-fast bacilli, in large numbers, were seen in smears from the lesion and were grown in culture. Culturally, the organisms appeared identical with *M. ulcerans*. The lesion extended very widely and deeply, involving muscle bundles and undermining subcutaneous tissue to the base of the tail. The histo-pathological appearances of the lesion are described subsequently.

Four possums, three males (678, 448 and 451) and one female (570), were inoculated with acid-treated material from possum 439. Three of these animals were inoculated subcutaneously in the right thigh; the remaining animal (451) was inoculated by the intraperitoneal route. Each of the animals inoculated subcutaneously developed at the site of inoculation an indurated lesion, which soon ulcerated. Acid-fast bacilli were very numerous in lesions of all three animals, and were recovered in culture.

Possum 678 was sacrificed seven months after inoculation, at which time the ulcer had extended widely with much necrosis and considerable secondary infection. A few acid-fast bacilli were found in the pleural fluid, but no other macroscopic or microscopic evidence of infection was found remote from the site of inoculation.

Possum 570, in addition to a lesion of the right thigh, developed extensive ulceration of the right malar region. Ultimately the orbit was invaded and completely disorganized. Acid-fast bacilli resembling *M. ulcerans* were found in smears and recovered in culture from both sites. It seems likely that the malar lesion followed transfer of infected material from the thigh by scratching. The animal was killed after the disease had progressed for some two months. There was no evidence of generalized infection.

Possum 448 died some months after inoculation. Unfortunately, post-mortem examination was not practicable. The lesion had, however, healed spontaneously and there was no evidence to indicate that infection remote from the site of inoculation had occurred in this case.

FIGURE III.

Possum 451, which was inoculated intraperitoneally, proved to be the most interesting experimental animal of this series. Four months after inoculation, the base of the tail and the scrotum became œdematous, and an ulcer shortly developed in this area. It healed within three weeks, but subsequently reappeared. Smears from this lesion showed acid-fast bacilli resembling *M. ulcerans*, but cultures were not prepared. A mass was observed in the right inguinal region and slowly increased in size without ulceration. The possum died six months after the appearance of the initial lesion. Œdema and infiltration of tissues, at the base of the tail and scrotum, were pronounced, and acid-fast bacilli were demonstrable in smears. The parietal peritoneum of the abdominal cavity and the scrotal tissues were infiltrated, but the testes were not involved. On histological examination the inguinal mass was shown to be a lymph node with much distortion of

architecture. Numerous acid-fast bacilli were found, but no other microorganisms were identified. Some round-celled infiltration of the adrenal, liver and left kidney was found. However, no acid-fast bacilli were demonstrated in these organs.

A further passage was made by subcutaneous inoculation of acid-treated material from possum 678 into the left thigh of possum 388. An ulcer appeared at this site, and acid-fast bacilli were found in the lesion, which later healed spontaneously.

Series B.—Two females, and the young of one of these, were inoculated with a suspension prepared from a culture of *M. ulcerans* isolated from the patient. One possum, which had been inoculated by the intraperitoneal route, developed a tumour in the region of the left knee three months later. A large amount of pus was aspirated from the lesion, which

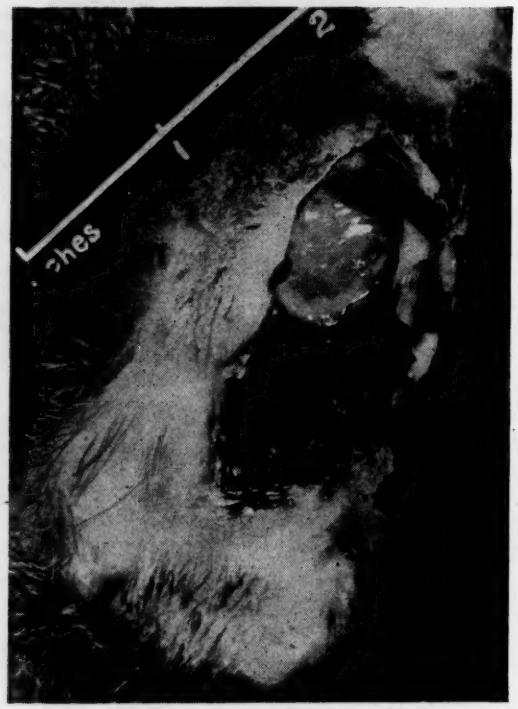

FIGURE IV.
Lesion in left thigh, possum 439 (male).

healed without ulceration. Numerous acid-fast bacilli resembling *M. ulcerans* were found in the pus and were recovered in culture. The young animal developed an ulcer at the site of subcutaneous inoculation in the tail; acid-fast bacilli were demonstrable in the lesion for a period of five months. The third possum also developed an ulcer at the site of subcutaneous inoculation in the abdominal wall, from which acid-fast bacilli were isolated. This ulcer healed spontaneously. One male possum, which had been exposed to contact with possums 376 and 576, developed an extensive lesion of the left aural region, from which acid-fast bacilli resembling *M. ulcerans* were isolated.

Lizards.

Two blue-tongued lizards (*Tiliqua scincoides*) were inoculated intraperitoneally with a concentrated suspension of an egg-yolk agar culture. The animals were killed twenty-six weeks after inoculation and no evidence of infection was found.

Fowls.

Two young domestic fowls were inoculated intramuscularly in the breast with a concentrated suspension of the patient's acid-fast organisms grown on egg-yolk agar. No evidence of infection was found twenty-six weeks later.

HISTO-PATHOLOGY.

Ulcer of Patient.

Histological examination of biopsy specimens, taken from the margin and the base of the ulcer, showed the following features. The epidermis, at the edge of the ulcer, was moderately hyperplastic. The floor and wall of the ulcer consisted of necrotic tissue, which undermined the margin of the intact epidermis to a varying degree, extended deeply into the dermis and involved the subcutaneous adipose tissue. At the margin of the necrotic area the dermis was infiltrated with round cells, which extended into the epidermal papillæ. The cell aggregates showed no tendency to localization about hair follicles, vessels or glands in the corium. There was no infiltration of nerve bundles.

The cell population consisted of lymphocytes, plasma cells and occasional macrophages, which showed no evidence of vacuolation. No follicles of epithelioid cells or giant-cell systems were seen. Polymorphonuclear cells were present, mainly in the superficial part of the ulcer, in association with secondary infection. The connective tissue stroma was densely fibrotic.

Acid-fast bacilli were found in abundance in sections stained by the Ziehl-Neelsen method. They occurred chiefly in necrotic areas, where cellular structure was largely destroyed, but were also observed in macrophages elsewhere. The organisms occurred frequently in large groups, which could be readily detected with the low-power objective of the microscope. Many curved and beaded forms were seen; no branching was observed.

Experimental Lesions in the Possum.

Cutaneous Ulceration.

In all cutaneous ulcers, histological examination showed tissue necrosis extending widely from the floor and walls of the ulcer, often involving muscle bundles in one direction and undermining the intact epidermis in the other.

Round-celled infiltration was always intense, not only at the immediate periphery of the necrotic tissue, but also at a considerable distance from the margin. When secondary infection was present, polymorphonuclear cells were numerous in the superficial zone. Elsewhere the cell population consisted of lymphocytes, occasional plasma cells and macrophages, none of which showed vacuolated cytoplasm. Giant cells were not observed, on any occasion, in these lesions. Nor was there any evidence of organized tissue reaction, except, of course, where reparative change, in parts of a lesion, was manifested by formation of new blood vessels and advancing leashes of fibroblasts.

Acid-fast bacilli were observed in enormous numbers in the ulcerated areas. They were located in large and characteristic masses in the necrotic tissue, but were also numerous elsewhere, both within cells and lying free in the stroma. Intracellular organisms were observed in macrophages, which were often swollen.

Blood vessels in the necrotic areas were frequently thrombosed or obliterated by endarteritis.

Scrotum (Possum 451).

The epidermis showed no abnormality, except in the region of an ulcer to which reference has been made earlier in the text. The subcutaneous tissue showed infiltration with round cells and macrophages and evidence of œdema, but there was little necrosis other than in the immediate vicinity of the ulcer. Scattered acid-fast bacilli were observed.

Lymph Node (Possum 451).

There was much distortion of the architecture of the gland. Germinal nodes were often replaced by fibrous tissue, with much hyalin deposition. There were extensive areas of necrosis. Lymphocytes and macrophages were

numerous at the periphery of the necrotic zones, but no giant cells were seen.

Many acid-fast bacilli were observed in necrotic tissue. They were found also in macrophages in adjoining granulation tissue.

DISCUSSION.

The identification of mycobacteria in a cutaneous lesion and the isolation of these microorganisms in culture raised, in the first place, the question of their ætiological significance. The mycobacteria were present in the lesion in enormous numbers, and their distribution appeared to be related to areas of greatest tissue damage. It is true that they were isolated from an open lesion. However, it is also true that they were recovered without difficulty from the ulcer after other invading bacteria were no longer demonstrable. Moreover, the behaviour of the microorganisms in culture and in experimental animals was inconsistent with what might have ordinarily been expected of saprophytic acid-fast bacilli.

Clinical findings and laboratory studies failed to support a diagnosis of tuberculosis due to any species of tubercle bacillus, to leprosy or—a very remote possibility—to human infection with Stefansky's bacillus. To our knowledge *M. johnei* has not been isolated from man. It is of interest to note that cutaneous reactions to an antigen of *M. ulcerans* have been found entirely different from those obtained with material from a case of ulcerous lazarine leprosy (Pardo-Castelló, Curbelo, Trespalacios and Márquez, 1951). The clinical appearance of the ulcer and its histological pattern corresponded closely with the findings recorded by MacCallum, Tolhurst, Buckle and Sissons (1948).

A Victorian strain of *M. ulcerans* was made available by Buckle and Tolhurst, and we were able to compare its bacteriological characters with those of the microorganism isolated from our case. The two strains were apparently identical in cultural and animal pathogenicity tests. We concluded that the microorganism isolated from the ulcer of our patient was a pathogen which could be identified with *M. ulcerans*.

Tests *in vitro* indicated sensitivity of the microorganism to streptomycin, to "Sulphetrone" and *p*-amino salicylic acid. Local application of *p*-amino salicylic acid and oral administration of "Sulphetrone" may have influenced rapid elimination of mycobacteria from two small areas of residual ulceration. However, we found no real evidence concerning the response of an ulcer infected with *M. ulcerans* to chemotherapy or antibiotics.

By subcutaneous inoculation, it was possible to passage the microorganism through three generations of possums with the production of a lesion at the site of inoculation, but no generalized infection. Two possums were inoculated by the intraperitoneal route, and in both animals lesions developed remote from the site of inoculation. We were unable to establish infection of possums by intraperitoneal inoculation with *M. phlei*; and, similarly, attempts to infect possums by various pathways with an emulsion of lepromatous tissue were unsuccessful.

Careful inquiry into the clinical history and environment of the patient failed to uncover any information of epidemiological interest.

Fenner and Leach (1952), in a study of the serological relationship of *M. ulcerans* to other bacteria, found the microorganism antigenically distinct from all other species of mycobacteria examined. However, complement-fixation tests with heat-killed bacteria suggested that it was more closely related to the mammalian tubercle bacilli than to other mycobacteria. Fenner (1952) found that animals sensitized with *M. ulcerans* reacted strongly to suspensions of the homologous organism, and there were some cross-reactions with other mycobacteria, particularly mammalian tubercle bacilli. Animals sensitized with mammalian tubercle bacilli (B.C.G.) reacted to *M. ulcerans*, but to a less degree than the reverse relationships.

The patient's ulcer has remained firmly healed during a period of approximately four years since surgical treatment was effected, and no lesions have appeared elsewhere.

SUMMARY.

1. An indolent cutaneous ulcer, due to *M. ulcerans*, occurring in a male patient, has been described.

2. Bacteriological findings and animal pathogenicity tests have been detailed.

3. Experimental evidence has been offered to indicate that the possum (*Trichosurus vulpecula*) is a useful experimental animal for *M. ulcerans*.

ACKNOWLEDGEMENTS.

We are indebted to Miss Jean C. Tolhurst and to Mr. G. Buckle for information relating to the cultivation of *M. ulcerans* and for the opportunity of comparing the microorganism isolated from our patient with the Bairnsdale strain. We wish to acknowledge the cooperation of Dr. A. Bolliger, Gordon Craig Research Laboratory, Department of Surgery, University of Sydney, in connexion with the possum experiments. We wish also to thank Professor Edward Ford, Director of the School of Public Health and Tropical Medicine, for his interest in the work, and the Director-General of Health, Commonwealth Department of Health, for permission to publish this paper.

REFERENCES.

BACKHOUSE, T. C., and BOLLIGER, A. (1951), "Transmission of Chagas' Disease to the Australian Marsupial, Trichosurus Vulpecula", *Tr. Roy. Soc. Trop. Med. & Hyg.*, 44 : 521.

BOLLIGER, A., FORBES, B. R. V., and KIRKLAND, W. B. (1950), "Transmission of a Recently Isolated *Mycobacterium* to Phalangers (Trichosurus Vulpecula)", *Australian J. Sc.*, 12 : 146.

ENGLUND, F., and WAHLGREN, F. (1944), *"Två fall av Posttraumatisk hudaffektion frainkallan av syrafasta stavar av okänd natur"*, *Nordisk Med.*, 24 : 2247; abstracted in Bull. *Hyg.* (1946), 21 : 144.

FENNER, F. (1950), "The Significance of the Incubation Period in Infectious Disease", M. J. AUSTRALIA, 2 : 817 (footnote).

FENNER, F. (1952), "Studies on *Mycobacterium ulcerans*. II. Cross-Reactivity in Guinea Pigs Sensitized with *Mycobacterium ulcerans* and Other Mycobacteria", *Australian J. Exper. Biol. & M. Sc.*, 30 : 11.

FENNER, F., and LEACH, R. H. (1952), "Studies on *Mycobacterium ulcerans*, I. Serological Relationship to Other Mycobacteria", *Australian J. Exper. Biol. & M. Sc.*, 30 : 1.

FORBES, B. R. V., KIRKLAND, W. B., and WANNAN, J. S. (1950), "An Unusual Species of Mycobacterium Isolated from a Chronic Cutaneous Ulcer", *Australian J. Sc.*, 12 : 217.

GELLERSTEDT, N. (1944), "On an Isolated Tuberculoid Form of Skin-Granuloma, Caused by Atypical Acid-fast Bacilli", *Acta path. et microbiol. scandinav.*, Supplement 54 : 574; abstracted in *Bull. Hyg.* (1947), 22 : 540.

LINELL, F., and NORDÉN, Å. (1952), *"Hundinfektioner i simhall genom ny art av Mycobacterium"*, *Nordisk Med.*, 47 : 888; abstracted in *Bull. Hyg.* (1952), 27 : 971.

MACCALLUM, P., TOLHURST, J. C., BUCKLE, G., and SISSONS, H. A. (1948), "A New Mycobacterial Infection in Man", *J. Path. & Bact.*, 60 : 93.

MELENEY, F. L., and JOHNSON, B. A. (1950), "Supplementary Report on the Case of Chronic Ulceration of the Foot due to a New Pathogenic Mycobacterium (MacCallum)", *Ann. Soc. belge méd. trop.*, 30 : 1499.

MELENEY, F. L., and JOHNSON, B. A. (1951), "Supplementary Report on the Case of Chronic Ulceration of the Foot due to a New Pathogenic Mycobacterium (MacCallum), (1951)", Reprinted Articles, *Internat. J. Leprosy*, 19 : 330.

NORDÉN, Å., and LINELL, F. (1951), "A New Type of Pathogenic Mycobacterium", *Nature*, 168 : 826.

PARDO-CASTELLÓ, V., CURBELO, A., TRESPALACIOS, F., and MÁRQUEZ, V. (1951), *"Contribucion al estudio de la identidad del Mycobacterium Ulcerans y la enfermedad de Bairnsdale"*, *Internat. J. Leprosy*, 19 : 187; abstracted in *Bull. Hyg.* (1952), 27 : 200.

VAN OYE, E., and BALLION, M. (1950), *"Faudra-t-il tenir compte d'une nouvelle affection à bacilles acido-résistants en Afrique?"*, *Ann. Soc. belge méd. trop.*, 30 : 619.

Reviews.

The Parietal Lobes. By Macdonald Critchley, M.D., F.R.C.P.; 1953. London: Edward Arnold and Company. 9½" × 6", pp. 488, with 10 plates and 137 illustrations. Price: 70s.

IN his preface to "The Parietal Lobes" Dr. Macdonald Critchley states that while these regions must be regarded as empirical conceptions rather than as autonomous anatomical or physiological entities, he feels that a survey of parietal symtomatology is of some value to the more general problem of cerebral localization. The opening chapters are appropriately devoted to anatomical and physiological considerations. One of the more curious symptom-complexes is the inability to recognize parts of the body, described first by Josef Gerstmann in 1924. The syndrome was found later to include other agnostic and apraxic defects, especially dysgraphia and dyscalculia. There may be unilateral neglect or more or less complete loss of awareness of one body-half, even in the absence of paralysis. There may be a phantom third limb, or the bizarre delusion that a paralysed limb belongs to another person.

Psychiatrists will be specially interested in the relation between parietal symptoms and dementia and hysteria, since agnosias, apraxias and aphasias may create the impression of more widespread defects. To Mayer-Gross and Guttmann's list of indications of diffuse involvements of true dementia Dr. Critchley has added his own formulation. Atrophic lesions in the right hemisphere often give rise to symptoms which resemble those of hysteria.

Neurologists are inclining more to the Gestalt theory and the author is of the opinion that no topic in neurology offers greater promise than the evaluation of the agnosias, for which the patient must be studied as a whole, including his physical and social environment.

In this fascinating work Dr. Critchley has demonstrated the variety and complexity of symptoms which may be revealed by careful clinical examination. One cannot help feeling, however, that clinical studies must be supplemented by equally searching examination of post-mortem material in selected cases. In addition to numerous diagrams and drawings there are ten plates showing neurologists who have contributed to our knowledge of the parietal lobes, and the list of references amounts to over a thousand.

The Heart Beat: Graphic Methods in the Study of the Cardiac Patient. By Aldo A. Luisada, M.D.; 1953. New York: Paul B. Hoeber, Incorporated. London: H. K. Lewis and Company, Limited. 10" × 7½", pp. 540, with 273 illustrations. Price: $12.00.

"THE HEART BEAT", by Aldo A. Luisada, is a book devoted to graphic methods in the study of the cardiac patient. After a short introduction, the first part of the book deals with the technique of recording and the normal record. There is a good account of phonocardiography as carried out with the most recent Sanborn apparatus developed by M. B. Rappaport. Subsequent chapters describe venous and arterial pulsations, intracardiac pulsations, ballistocardiography, electrokymography, plethysmography and electrocardiography. There are also smaller chapters on some of the less known movements of the body due to cardiac action. The major subjects are not treated exhaustively. Each chapter consists largely of a summary of present knowledge together with an adequate but not complete bibliography. The third and fourth parts of the book deal with physiological variants and clinical applications.

This book undoubtedly contains much valuable material, but it is not complete enough for the experienced cardiologist or for the trainee cardiologist who is using the graphic methods described, and for whom the author sets out to write.

Notes on Books, Current Journals and New Appliances.

Family Doctor. Published monthly by the proprietors, the British Medical Association, Tavistock Square, London, E.C.1. Sole agents for Australia and New Zealand: Gordon and Gotch (Australia), Limited. Subscription for twelve months: 20s. (sterling), including postage.

THE March issue of *Family Doctor* is a special number containing 25 major articles ably and interestingly written by a variety of experienced writers. Subjects include the child who asks questions, the hereditary factors in size and shape, "how to live with your blood pressure" (by Walter C. Alvarez), posture, the meaning of being normal, "prevention is better than cure", disappointment and what to do about it, appendicitis, schizophrenia, the care of the hands, the psychology of breast feeding, and a detailed article on the refrigeration storage of various kinds of food in the home. In addition, there are all the usual features and many small articles of interest. The illustrations and general make-up are as attractive as ever. Doctors who have not made the first-hand acquaintance of this excellent popular medical magazine are invited to write to the Editor of THE MEDICAL JOURNAL OF AUSTRALIA for a free sample copy.

Books Received.

"The Physician's Index of Australia and New Zealand", edited by B. G. G. Fegent, M.P.S. (N.S.W.); Third Edition; 1953. Sydney: Butterworth and Company (Australia), Limited. 10" × 6", pp. 574. Price: 52s. 6d.

The most important part of the book is an alphabetical index of ethical preparations available in Australia and New Zealand.

"The Surgical Clinics of North America"; 1953. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. Philadelphia Number. 9" × 6", pp. 294, with 109 illustrations. Price: £6 *per annum* in paper binding and £7 5s. *per annum* in cloth binding.

A "Philadelphia Number" consisting of a symposium on orthopædic surgery containing 22 articles with a foreword. The symposium deals with many practical subjects.

"The Medical Clinics of North America"; 1953. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. Philadelphia Number. 9" × 6", pp. 332, with 129 illustrations. Price: £6 *per annum* in paper binding and £7 5s. *per annum* in cloth binding.

A "Philadelphia Number" consisting of a symposium on clinical medicine of 23 articles covering a wide range of subjects.

"The Year Book of Radiology (1953-1954 Year Book Series)": "Radiologic Diagnosis", edited by John Floyd Holt, M.D., and Fred Jenner Hodges, M.D.; "Radiation Therapy", edited by Harold W. Jacox, M.D., and Vincent P. Collins, M.D.; 1953. Chicago: The Year Book Publishers, Incorporated. 9" × 6", pp. 462, with 399 illustrations. Price: $8.00.

One of the "Practical Medicine Series of Year Books".

"Diagnosis of Acute Abdominal Pain", by William Requarth, M.D., with a foreword by Warren H. Cole, M.D.; 1953. Chicago: The Year Book Publishers, Incorporated. 8½" × 6", pp. 244, with 79 illustrations. Price: $5.00.

One of the series of "General Practice Manuals".

"Textbook of Gynecology", by John I. Brewer, B.S., M.D., Ph.D.; 1953. London: Baillière, Tindall and Cox. 9" × 6½", pp. 550, with 146 illustrations. Price: 76s. 6d.

The book is divided into two parts. The first has sections dealing with disease conditions and the second is divided into sections in which signs and symptoms are discussed.

"Lyle and Jackson's Practical Orthoptics in the Treatment of Squint (And Other Anomalies of Binocular Vision)", revised by T. Keith Lyle, C.B.E., M.A., M.D., M.Chir. (Cantab.), M.R.C.P. (London), F.R.C.S. (England), assisted by Marianne Walker, D.B.O.(T.); Fourth Edition; 1953. London: H. K. Lewis and Company, Limited. 10" × 7½", pp. 384, with three coloured plates and 192 illustrations. Price: 63s.

The first edition of this well-known book was published in 1937.

"A Synopsis of Anæsthesia", by J. Alfred Lee, M.R.C.S., L.R.C.P., M.M.S.A., D.A., F.F.A.R.C.S.; Third Edition; 1953. Bristol: John Wright and Sons, Limited. 7½" × 5", pp 492, with 72 illustrations. Price: 21s.

The first edition was published in 1947.

"The Psycho-Analysis of the Nursery", by Alice Balint; 1953. London: Routledge and Kegan Paul, Limited. Sydney: Walter Standish and Sons. 8½" × 5½", pp. 156. Price: 12s. 6d.

The English edition of an Hungarian book which has also been translated into German, French and Spanish.

The Medical Journal of Australia

SATURDAY, MARCH 27, 1954.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

FEAR, FRUSTRATION AND FUTILITY IN INDUSTRIAL MEDICINE.

THE poet Wordsworth wrote in Book Four of "The Excursion":

> We live by admiration, hope, and love;
> And even as these are well and wisely fixed,
> In dignity of being we ascend.

The more we think about these words, the truer we find them to be. And they are true in every walk of life. With admiration we may include appreciation, and we all know how a word or two of appreciation from any understanding person will help us in whatever we are doing. In hope, we include a desire to feel that what we are doing is worth while, that it is being done well, and that the future will hold still larger opportunities for us. Under the heading of love we should place a sense of the brotherhood of man, that we can "love our neighbour as ourselves". With these thoughts in mind it is arresting to see that Rutherford T. Johnstone, of Los Angeles, read before the Congress on Industrial Health of the American Medical Association in January, 1953, an article entitled: "Fear, Frustration and Futility: The Industrial Aspect".[1] In the first part of his paper Johnstone states that we are not acutely aware that there is now taking place the first world-wide revolution recorded by history. He has something to say about the condition of many people in the world because of poverty, misery, malnutrition and disease, and he reminds his listeners that the present swift method of communication transmits to Americans, as it does to us in Australia, the seething tension in far-off areas. He states that practically no American is unaware of a degree of futility in his pursuit of a happy life. It would be possible at this point to ask why man wishes to pursue a happy life, whether it is for himself alone or whether he includes in his desires a happy life for other people. But this temptation must be resisted. Johnstone declares that in America, race, creed and colour are set against race, creed and colour, and we know that the same thing is going on all over the world. To discuss this world-wide question was not Johnstone's object, and the problem need not detain us at the moment. He was concerned chiefly with industrial medicine.

Johnstone refers to problems in the field of industry—to working conditions and so on, and to measures that have been taken to remedy them. He thinks that a great deal of the industrial relations programme has come into being and has been relegated to the department which deals with industrial relations, because the medical practitioner has fallen down on his job. He admits that certain industrial practitioners are practising an intimate patient-physician type of medicine, because they are near to the hearts of men. However, he points out that fear, frustration and especially futility frequently arise from the feeling of utter helplessness that the individual worker has when management and labour leaders enter a prolonged period of stubbornness—when a "needless calamity known as a strike" comes into existence. This is beyond the direct scope of the medical practitioner. The two most prevalent errors which practitioners have committed are: (*a*) attempting to carry out a too crowded schedule and (*b*) failing to visualize all facets of what is termed work and thereby arriving at an erroneous diagnosis. Johnstone deals first of all with the last of these two questions. In doing so, he gives details of an erroneous diagnosis which caused a worker a good deal of anxiety, and secondly he refers to a case in which a girl was subjected to fear and frustration because no medical practitioner with whom she came in contact had bothered to inquire about the type of work which she was doing. The work on which she was engaged was responsible for her illness. Wrong diagnoses are admittedly liable to occur, but when they prove extremely upsetting to a worker's way of life and there is any doubt whatever, steps should be taken to confirm the diagnosis. In the second instance there is no excuse for the mistake. It is surely one of the first desiderata that in the examination of an industrial worker some attempt should be made to assess the part which his or her occupation may have played in the establishment of the illness. The question of whether medical practitioners are attempting to carry out what Johnstone calls a too crowded schedule—in other words, whether they are trying to do too much work—could be discussed at some length. It should only be stated that if a medical practitioner finds that he cannot give sufficient time to the proper examination of his patients he must give up some of his appointments or get somebody to help him. Johnstone deals with a view which has been discussed on previous occasions in this journal. He states that "we have permitted the practice of industrial medicine to become integrated with the business of management". On more than one occasion contributions to this journal have been rejected because the author has advanced the view that the work of an industrial medical officer consists solely in examining workers so that they will be more efficient from the management point of view and be able to carry out more work for the industrial concern. If the good of the individual is not to be the first consideration,

[1] *Arch. Indust. Hyg.*, November, 1953.

industrial medical officers must not expect cooperation from industrial workers. Admittedly, a healthy worker is a more efficient worker, and for this reason would be more welcome to his employer than one who is not healthy, but it is quite wrong to put this as the first objective. Workers should be happy and contented in their work, and they cannot be either unless they are in good health. Obviously, when an industrial process entails certain steps which may be prejudicial to health, then the supervision of a medical officer is essential. Johnstone describes a condition in which "industrial physicians, along with a medical director, will meet in the office of the industrial relations manager, to be told of new requirements or the discontinuance of certain procedures". In other words, medical industrial officers are asked to confer on methods of factory procedure which are outside their province, presumably with the object of increasing output. He asks whether this is practising medicine. The answer, of course, is that it is not. He goes on to state that if the management feels it is necessary for a physician to do these things, then the management should employ additional physicians who do nothing but practise medicine and are given sufficient time to get close to the multiple problems that the worker would like to discuss with the one man whom he feels he can trust. Johnstone puts it very tersely when he states that a physician cannot relieve tension if he has no time to associate with the worker.

Another subject which comes up in this matter has to do with possible undesirable results arising from a five-day working week. Johnstone raises the question of the proper use of the leisure time from Friday afternoon until Monday morning. He quotes Luongo as writing: "A poison can be defined as too much. It can be too much work or too much play. Many employees report to the medical department with ailments caused by imbalance in their daily lives. If good use is made of leisure time, many ill effects of tension can be prevented." Reference is also made to examination prior to employment. This examination is quite often a cause of fear, frustration, and most certainly a sense of futility. Johnstone refers to a mechanic who had been refused employment by various industries on the basis of a moderately elevated blood pressure. This man, he thinks, was the victim of circumstances which were not of his own doing. He adds that undoubtedly in a spirit of trying to secure the greatest benefits for the working man, labour has unwittingly placed itself in a position similar to that of an Australian aboriginal who tried to throw away his boomerang. We have previously referred to instances in which a young person has undergone a period of special training in a government-controlled institution after an illness such as poliomyelitis and has achieved a position in which he was able to work, only to find that on application to another government department he was refused work on the ground that he might be a burden in future years because of industrial compensation. Johnstone declares that for every worker in whom occupational disease develops there are thousands in whom there develop fear, frustration and futility born out of stupidity in human relations. Johnstone has some suggestions to make. Let us quote him at length:

> First, let us be big enough to admit that the source of fear, frustration and futility within industry is tripartite, namely, medicine, management, and labor. As for the medical responsibility in the situation, let us start with the undergraduate or postgraduate student preparing to enter industrial medicine. Let us teach him more about human relations and that he needs to know as much about emotion as he knows about drugs or microbes. In our teaching let us impress upon him that he needs to know more about common problems of the worker than he does about forms, figures, and laws. Let us embue in him the fact that he is going to work for workingmen, not for a company or a union—all this despite the present prevailing philosophy. But let us not stop there. Once the newly tutored physician enters the company plant, the medical director has a responsibility to see that these ideals are continued. This is not asking too much. On the contrary, it would seem the final step in fulfilment of the responsibility of medicine in this problem. Every medical director has a great opportunity to be a teacher, and he should consider his plant a teaching ward.

At his conclusion Johnstone states that neither pure science nor technology, nor even plumbing, can exist in a social vacuum. The social organization, he declares, is the forerunner of them all, and that springs from the conscience of man himself. Progress, he thinks, "springs from that yeasting inside of man which first sets him trying to define right and wrong, gives him a sense of responsibility towards his neighbor, and binds him into a community to whose laws he agrees to submit in the interests of his own freedom and security". This brings us back to our original quotation from Wordsworth. We can achieve great things and make of ourselves a nation worthy of respect and honour, if we are prepared to give to others a little admiration (let us call it appreciation, if that is preferred), if we keep hope alive in our own minds and encourage it in those of others and if we try to achieve some kind of love for humanity, in other words if we are proper neighbours to one another, whatever our craft or calling may be.

Current Comment.

PULSUS ALTERNANS AND POSTURE.

THE observation of *pulsus alternans* in circulatory disease has the particular merit of simplicity, at least in its recognition, though discussion as to its genesis has gone on for many years. B. Friedman, W. M. Dailey and R. S. Sheffield have published some detailed studies carried out on three patients in whom the phenomenon of *pulsus alternans* was present, and who suffered from different types of cardiac disease.[1] These patients have been under observation for two years, during which a striking relation of the alternating pulse to the erect or semi-erect posture has been constantly noted. One patient had previously had an attack of congestive failure associated with hypertension, another had had an attack of congestive failure due to coronary sclerotic disease, and the third had myocardial affection of uncertain ætiology, associated with enlargement of the heart. Full descriptive reports of the clinical condition of these patients are given. *Pulsus alternans* was evident in the first patient, and in the erect position the difference in the systolic blood pressure amounted to as much as 30 millimetres of mercury. A similar pulse anomaly was noted in the second man, when he was in the semi-erect or sitting position, but not in the recumbent position. In the third patient the weak beat of the alternating pulse was at times imperceptible when he assumed the sitting position, but all alternation disappeared when he lay down. The question of coronary occlusion was raised in this patient, but no evidence was found.

The effect of various procedures was tested in all three subjects. A tilting table was used which could be placed at any angle. Records were made of the carotid or jugular pulse, of the heart sounds and of the electrocardiographic

[1] *Circulation*, December, 1953.

changes. These records were made repeatedly over the period of observation, during which the observers found that *pulsus alternans* was consistent in each subject; any alteration was only a matter of degree, and in particular, the length of time required for the patient to remain standing before alternation appeared was constant. Minor changes in systolic blood pressure were also found. Occasionally ectopic heart beats would be noted, and were followed by accentuation of the existing alternation or by the induction of alternation for a run of beats. Electrokymographic records were also made; these showed a concordant alternation of the amplitude of the ventricular contraction. No alternation of the auricular function was observed. An interesting observation was the effect of external hydrostatic pressure. The patients were first examined standing on the edge of a tepid pool of water, when alternation was well in evidence. As they descended step by step recordings were taken at each step until they were immersed to the middle of the chest. It was found that as the level of water rose above the hips the weak beat gradually increased in strength until the water was half-way up the chest, when the alternation nearly disappeared in one subject and quite disappeared in the other two. This state of affairs persisted as long as the patients remained at this water level. Binding the legs and the abdomen produced the same effect as hydrostatic pressure. Exercise stopped the alternation, even though it raised the heart rate. Transfusion of blood tended to prevent alternation, while phlebotomy tended to induce or exaggerate it. Drugs which increased peripheral resistance, and those which improved myocardial efficiency abolished or diminished it. In their discussion the authors point out that factors considered relevant to the production of *pulsus alternans* are myocardial and hæmodynamic, and that the relative importance of these has been debated for fifty years. They quote Wenkebach, who pioneered the view that changes in filling of the ventricle and in peripheral resistance could cause alternation either transient or sustained, quite apart from any myogenic disturbance. Wiggers has stressed the importance of myocardial factors and the need to recognize that myocardial factors could operate in addition to those of hæmodynamic order. Taking into consideration the views of advocates of both types of cause and the findings in their own investigation, the authors conclude that *pulsus alternans* can be caused by a lack of contractile strength of the ventricle except when it is under conditions of increased stretch, and by changes in ventricular inflow and peripheral resistance due to some external precipitating factor. The most practical outcome of these investigations is the recognition that alternation is most easily detected when the patient is sitting or standing. Perhaps, too, the implied importance of posture in examination of the heart will be a reminder of cardiac physiology.

BEE AND WASP STINGS.

THE discomfort of bee stings is well known, though apart from the procedures of bee-farming it would seem to be unusual for bees to present a hazard to the peaceful citizen who adopts a policy of non-interference. In centres of population other than the crowded parts of cities the wasp is not uncommon, but appears to be of the non-social species of vespid which sting only if disturbed. One difficulty here is that the solitary species constructs cells in inconvenient places; the house-dweller sometimes does not possess enough calm or trust to leave these intruders alone. With the honey bee, of course, the species is social and the population large. It does not seem, therefore, that being stung by wasps or bees is a hazard of high order, but it is well to remember that anaphylaxis caused by bee stings, or even by the sting of one bee, may even threaten life. Harry L. Mueller and Lewis Webb Hill present a recent article from Boston, dealing with allergic reactions to bee and wasp stings.[1] They think that severe reactions have occurred more frequently during the last few years, and point out that since Waterhouse drew attention to the anaphylactic nature of such reactions in 1914, the potential danger to the sensitive person has been regarded as real, even though it is rare. They state that there are some 15 species of social bumble bees in New England which nest underground, in addition to the familiar honey bee, which may easily be provoked to wrath. The vespids, including those wasps known as hornets, are represented by 12 species and build nests holding thousands of individuals. The authors find that sufferers from stings seldom can describe the species at fault, which is not surprising. In any event it seems likely that the bee communities would be a greater hazard than wasps. The most technically important questions are the recognition of a true anaphylaxis when it occurs, for action should be prompt, and the method of desensitization. Bee sting anaphylaxis is the same in nature as other forms of this emergency, and the familiar distress and chest constriction may appear very quickly. Since the bee leaves the sting sac behind it, a gentle effort should be made to express it. Local treatment is chiefly a matter of comfort, but a severe anaphylaxis demands the administration of adrenaline or other treatment for shock. Mueller and Hill give a full and interesting account of desensitization. The question of true specificity has not been quite settled. Where bees are concerned one cannot be sure that cautious and increasing doses of bee venom will give any protection against wasps, or *vice versa*. Where there is no question that the patient has been stung by wasps it would be necessary to secure specimens for possible identification, and for the preparation of antigen. When the offenders are bees the problem would be simpler. There is, however, another difficulty. It seems that when a true anaphylactic reaction occurs the antigen is rather the whole bee than merely the sting and venom. An antigen for treatment would then be appropriately made from the defatted bee. In America it would appear that some seven manufacturers will prepare material for desensitization; if exact species of wasp can be identified they are used, if not a bee extract could be used, or a commercial preparation made from wasps.

It does not seem likely that such action would be often needed in Australia, but if a genuine instance of shock is observed it would appear wise to try to prevent further risk if the person concerned is likely to be exposed to further hazard. In the rare event of desensitization being carried out, the duration of treatment, in accordance with the literature, would preferably be extended over a considerable period. Though it is admitted that this subject can occupy only a very small niche in clinical medicine, it reminds us that man is vulnerable to many of the inhabitants of the same world as that in which he produces enough turmoil by his own unaided efforts.

[1] *New England J. Med.*, October 29, 1953.

PYURIA IN CHILDREN.

THE methods to be adopted in the examination of the urine of children suspected of suffering from renal tract infections and the interpretation of the results present some vexed problems. In the view of J. M. Stansfeld and J. K. G. Webb,[1] the diagnosis of renal tract infection rests upon the recognition of symptoms and the demonstration of pyuria. Although they agree that the bacteriological findings from examination of catheter specimens of urine can support this diagnosis, they consider that these can never form its basis, as contamination occurs so readily. They go on to point out that in acute infections symptoms are usually prominent, but in chronic pyelonephritis, in which the infection may be of low grade but persistent, symptoms may be minimal. The diagnosis in such cases depends on the demonstration of pyuria, which may be modest and intermittent. To know the difference between a high normal excretion of leucocytes in the urine and a low-grade but significant pyuria is therefore crucial. It is the belief of Stansfeld and Webb that the common

[1] *Arch. Dis. Child.*, October, 1953.

practice of measuring pyuria by the number of leucocytes per high or low power field of centrifuged urine is a very crude method. They point out the lack of agreement which exists in interpreting the significance of the presence of only a few cells, and the impracticability of making an accurate Addis count. For four years they have used the method of counting the pus cells present in one cubic millimetre of uncentrifuged urine, and now believe it to be the method of choice. They state that in a series of 632 normal children 98% of urine specimens from boys contained less than 10 cells per cubic millimetre, and 84% of specimens from girls contained less than 10 cells per cubic millimetre, but 95% of specimens from girls under one year of age contained less than 10 cells per cubic millimetre. Vulval contamination was shown to be important in producing the occasional higher cell counts in girls over one year of age. An attempt to correlate the counts in cells per cubic millimetre with those found per high power microscopic field led them to the conclusion that, except in girls over a year old, an average count of more than one cell in ten high power fields seldom occurs under normal conditions. In summing up, they stress the need to examine many specimens of urine before dismissing the possibility of renal tract infection, and the impossibility of setting a critical figure for pus cell counts above which there is infection, though they have accepted counts as low as 100 cells per cubic millimetre as confirming the diagnosis of infection when the clinical picture was really suggestive of pyelonephritis.

DAY TREATMENT FOR PSYCHIATRIC PATIENTS.

THE difficulty of providing sufficient hospital beds for the treatment of psychiatric patients is a fairly general problem. On the other hand, treatment in the usual psychiatric out-patient department of a general hospital is limited in its scope and value. Treatment centres designed for patients who can attend each day offer a possible compromise, and it is of interest to read of two such centres, one in Montreal and the other in Bristol. The Montreal centre is described by A. E. Moll.[1] It is at the Montreal General Hospital and has been in operation since 1950. The centre was a development from the psychiatric department of the hospital, and Moll acknowledges assistance from the experience of the Allan Memorial Institute of Psychiatry, where, apparently, a day treatment unit has been functioning since 1946. At the Montreal General Hospital centre the majority of patients report at 8.30 a.m. and return home at 4.30 p.m. on five days a week. On Saturday the centre is open only from 8.30 a.m. to 1 p.m., and no treatment is given on Sunday. Much thought has been given to the planning of the centre and the creation of a suitable atmosphere, an attempt being made to do away with the traditional "cold and sterile atmosphere" of hospitals. Moll suggests that it would not be unsound to suggest that treatment begins the moment the patient enters the doors of a psychiatric unit, provided the entire staff is so equipped in its motivation as to offer a sympathetic approach. This is the keynote for the design and organization of the unit, as well as the attitude of all members of the staff including administrative officers. The treatment unit occupies one floor and has facilities for subcoma insulin and electroconvulsive therapy, as well as narcoanalysis. Beds in the treatment unit are occupied in the morning by patients undergoing subcoma insulin therapy, and in the afternoon by the patients treated with electroshock. Luncheon is provided in a dining room, where the aim is to stimulate interpersonal relationships. The nurse in charge of the insulin treatment supervises the luncheon arrangements and, in Moll's words, "by her presence carries through the maternal giving from the insulin ward to the dining room". After luncheon the patients take part in occupational therapy. All patients receive individual therapy by a member of the psychiatric staff, and non-directive group therapy takes place twice a week. The staff is made up of three part-time psychiatrists, full-time resident medical officers and ancillary workers, all under the control of a director. Practically all types of patients can be treated, with the exception of those suffering from an acute psychotic condition requiring constant supervision of a restrictive nature. The centre is also not suitable for the treatment of mental defectives. Moll lists a number of advantages offered by the day treatment unit. It permits of treatment at a fairly reasonable cost—an important factor both for patients and for hospitals. It allows treatment of numerous patients, such as mothers and wives, who, because of other responsibilities, would not otherwise agree to admission to hospital. It is helpful for other patients for whom in-patient treatment is not necessary, particularly those whose recovery is enhanced by absence from stress-producing home situations, even if only for part of the day. The fact that the patient retains contact with his family obviates the excessive dependence upon hospital care that sometimes occurs in a ward. It is possible to discharge in-patients from hospital earlier, and their rehabilitation can be carried on at the centre. In addition, Moll states, patients advised to accept treatment in a day centre react with less anxiety than if recommended for admission to a ward.

The Bristol unit is described by K. W. Aron and S. Smith.[1] Here the patients attend from 9.30 a.m. to 4 p.m. The only requirement for admission is that the patients are well enough to stay at home at night. Three main groups are included: firstly, the convalescent group who have already had in-patient treatment; second, the treatment group who are receiving electric shock treatment and psychotherapy; third, the observation group whose illness has been rather vague and requires further study. In twelve months, 307 patients have been treated at this centre; 67 of these discharged themselves against medical advice. It was found that certain dependent neurotics accepted the day hospital too willingly, but some lonely elderly people have found much comfort there. Some difficulty has been experienced in getting patients to attend the unit at a specified hour, but it seems that there is much less anxiety created by attending the day hospital than by admission of the patient to hospital for in-patient treatment. Aron and Smith point out that this retention of the patient's independence is probably important when the emphasis is on resettling the patient in the community, occupied and socially adjusted. Further emphasis is given to the value of this scheme by general dissatisfaction felt among psychiatrists with the in-patient treatment of patients suffering from neurosis. The opinion has been expressed that the in-patient stay of such a patient should not exceed six weeks; but the day treatment centre makes continued supervision possible and of value.

Moll points out that the advantages of such a centre do not preclude the need for psychiatric wards in a general hospital, and, in fact, the experience has been that the better the facilities of such a kind, the greater the number of patients examined and the larger the admission rate to the psychiatric ward. Nevertheless, the position is more satisfactory. Naturally, as Moll states, a treatment clinic of this sort is only as good as the personnel that serves it and the quality of the teamwork offered.

[1] *Am. J. Psychiat.*, April, 1953.

THE ROLE OF OXYGEN IN THE GENESIS OF RETROLENTAL FIBROPLASIA.

QUITE strong evidence has been put forward to relate the development of retrolental fibroplasia in infants in some way to oxygen therapy. More detailed examination of the evidence has, however, failed to provide a precise definition of that relation; the recorded observations, as well as the inferences drawn from them, are in seeming conflict. Presumably this conflict will eventually be resolved, and we shall understand what happens. Meantime, it seems fair to adhere to a view quoted in a dis-

[1] *J. Ment. Sc.*, July, 1953.

cussion of the subject in these columns about a year ago[1]—namely, that there are now sufficient data to question the advisability of the routine use of prolonged high oxygen concentrations in the nursery. Of course, this does not go far enough, and clinical and laboratory investigations are proceeding in various centres in an effort to clarify the position. An interesting contribution to this work is a laboratory investigation by Norman Ashton *et alii*[2] into the influence of varying concentrations of oxygen upon the immature retina. The laboratory animal selected was the kitten, as the degree of retinal vascularization in the full-term kitten at birth and in the ensuing three weeks is comparable in extent to that of the premature baby. Bacteriological incubators were converted into gas chambers, into which oxygen was passed through an inlet tube; the flow was so adjusted as to provide a concentration of 75% to 80% of oxygen. The mother cat and test kittens were placed in the chamber and maintained in the experimental conditions for some days; at the end of each experiment the kittens were anæsthetized, and after one eye had been removed for section, the left ventricle was injected with indian ink. The remaining injected eye was then removed and placed in fixative for twelve hours; after freezing it was opened transversely, and the retina was removed and mounted flat for study under the stereoscopic microscope. The findings indicate that high concentrations of oxygen are able to obliterate the ingrowing vessels in the developing retina of the kitten. Since the fully mature retina of the kitten was not affected, it would appear that this process represents a specific effect upon growing vessels or a fundamental interference with the process of vascularization. Obliteration of the vascular channels is irreversible in many vessels, and this appears to be due to some extent to the coagulation of entrapped blood. After the animal is transferred to air, such vessels as remain patent refill with blood, but the resulting vascular architecture is grossly abnormal, consisting of an irregular cobweb of vessels without definition into arteries or veins, and extensive hæmorrhages may appear at the periphery of the reopened network. New vessels are seen growing into the vitreous eighteen days after exposure to high concentrations of oxygen, and this is accompanied by retinal detachment thirty days after such exposure. The authors think it probable that similar obliteration of retinal vessels may occur in the premature infant, and that this may be the underlying cause of retrolental fibroplasia. While the basic injury of vascular obliteration is inflicted in high oxygen concentrations, the effect of this action is not evident until the animal returns to ordinary atmospheric conditions.

COLLES'S FRACTURE.

ALTHOUGH it is by no means easy to be sure of obtaining a satisfactory result in the treatment of Colles's fracture, this treatment is often successfully undertaken by general practitioners as well as specialists. Consequently, there should be general interest in some figures compiled by *Robert W. Bacorn and John F. Kurtzke*[3] *from the files of* the Workmen's Compensation Board, New York State Department of Labour. These figures relate to 2132 cases of Colles's fracture. It was found that in the records this type of fracture made up 60% of fractures of the radius. *In 88·3% of cases reduction of the fracture was performed,* manipulation being carried out for a second time in 3·7%, and for a third time in 1·0% of cases. In only 1·6% of *the total was open reduction performed. Of the 11·7% of* cases in which no reduction was performed according to the records, Bacorn and Kurtzke reached the conclusion that in almost one-half manipulation was required. The average duration of treatment was four months. The *information about disability resulting from the fracture* is of considerable importance. The average (mean) percentage loss of function or disability in the whole group *of patients is described as 24% loss of the hand, an* assessment based upon the findings of the Workmen's Compensation Board medical examiners. The range of disability was from nil to 100%, and of the total group 94% had a resultant disability of less than 50% loss. The percentage of disability following Colles's fracture increased directly with age at a rate of approximately 4% loss of function per decade. Residual deformity (as an inverse measure of adequacy of reduction and immobilization) was found to have a direct correlation with disability at a rate of 10% loss of function per grade of deformity (the grading being described as "none", "mild", "moderate" and "marked"). It is of interest to note that the duration of immobilization in the treatment of Colles's fracture apparently had no effect upon final residual disability. The most frequent defect in passive movement about the wrist was one of palmar flexion, which was present in 94·5% of the cases. A defect in dorsiflexion was found in 80% of cases. Limitation of rotation of the forearm was present in one-third and limitation of lateral wrist motion in one-half of the cases. In 48% of cases there was restriction of movement of the digits, in both flexion and extension, but flexion defects were twice as frequent as extension defects. The joints most often affected were the distal interphalangeal joints, these being most often involved in the index finger; the interphalangeal joint of the thumb was the digital joint least often affected. It was also found that one-third of the patients who had suffered from Colles's fracture had a residual diminution of the grip, which was mild or moderate in severity in all but 3% of the total number of cases. Non-union of the fracture was found to occur in 0·2% of cases. Other complications included traumatic neuritis (0·2%), causalgia (0·1%), Sudeck's atrophy (0·1%), Dupuytren's contracture (0·2%), persistent pain (2%), limitation of shoulder movement (1%), compound fracture (1·2%) and concomitant navicular fracture (0·5%).

[1] M. J. AUSTRALIA, March 21, 1953.
[2] *Brit. J. Ophth., September, 1953.*
[3] J. Bone & Joint Surg., July, 1953.

THE USE OF FRUCTOSE IN DIABETIC KETOSIS.

IT has long been known that fructose, when administered intravenously, is removed from the blood rapidly and as rapidly by the diabetic without insulin as by the normal subject. Fructose enters cells by phosphorylation to form fructose phosphate under the influence of fructokinase, *which does not require activation by insulin and* within the cell it is rapidly converted into glycogen. One of the blocks in carbohydrate metabolism in *diabetes mellitus* is the phosphorylation of glucose which requires the presence of insulin. Other enzyme systems concerned *with sugar metabolism are present in the cells in diabetes.* An investigation has been made by J. H. Darragh, R. A. Womersley and W. H. Meronéy to discover whether *fructose could be utilized by patients with diabetic ketosis* at a time when glucose utilization is reduced to a minimum.[1] If this is so, carbohydrate metabolism would be restored with a resulting decrease in ketone body production, decreased ketonæmia and correction of the dis*turbance in acid-base equilibrium. Fructose might also* serve as a convenient vehicle for the administration of water by giving fructose in an isotonic solution, 2·5% *fructose in 0·45% sodium chloride. The patients given* this solution intravenously manifested a progressive fall in the blood glucose content in spite of the administration of 75 to 225 grammes of fructose. In every patient there was a steady and rapid fall in the total ketone content of *the blood. The decrease was greater than that which* could be attributed to dilution of the body fluids by the infusion of the fructose-hypotonic saline solution. Insulin *was given before or with the fructose. By using fructose* instead of glucose, together with adequate amounts of insulin, carbohydrate can be administered early in the course of treatment of diabetic ketosis without a resulting increase of the effective osmotic pressure of the extra*cellular fluid. The dehydration associated with diabetic* ketosis can be corrected rapidly by infusing hypotonic electrolyte solution made up to isotonicity with fructose.

[1] J. Clin. Investigation, December, 1953.

Abstracts from Medical Literature.

THERAPEUTICS.

Tracheitis.

ROBERT M. SMITH (*Current Res. in Anesth. & Analg.*, March, 1953) describes a method of endotracheal intubation in children designed mainly to prevent the post-operative onset of tracheitis which, when severe, requires tracheotomy. He quotes a series of 3000 cases without tracheotomy or other serious complication; a careful follow-up of 540 of the patients revealed that obstruction as shown by suprasternal retraction occurred in six cases, sore throat in 14 cases, cough in 32 cases and hoarseness in 43 cases. He advises the use of correct size laryngoscope and tubes, gentleness, a well-relaxed patient held in the most advantageous posture, secure fixation of the tube to prevent friction and avoidance of high flows of dry gases. He states that irritant chemicals such as sterilizing solutions or special lubricants should never come into contact with the endotracheal tubes. Organismal contamination is considered the major factor in the causation of tracheitis, and therefore all laryngoscopes, tubes and suction catheters should be boiled before use, stored in clean containers, handled as little as possible and inserted without lubricant through the mouth except when use of the nasal route is imperative. The treatment of tracheitis includes administration of antibiotics and oxygen, humidification and tracheotomy.

Dibenzyline.

S. I. MILLER *et alii* (*New England J. Med.*, April 2, 1953) discuss the treatment of hypertension with N-phenoxyisopropyl-N-benzyl-β chlorethylamine ("Dibenzyline"). They treated 32 patients suffering from severe hypertension, with complications such as encephalopathy and coronary lesions in many cases. The dosage to outpatients was 20 milligrammes given orally every five hours, and to inpatients 20 milligrammes every four hours until the blood pressure fell. The drug was given in gelatin capsules. Fifty-four patients were given 250 milligrammes of hexamethonium or more every five hours. Sixty-one outpatients were given extracts of *veratrum viride*. "Dibenzyline" reduced the blood pressure significantly, but toxic effects were common—tachycardia, syncope, giddiness, amnesia, and loss of concentration. The pulse rate increased by 20 or 30 beats per minute. Eleven patients improved and continued to take the drug. *Veratrum viride* ("Apresoline") also reduced blood pressure, but toxic effects were frequent. The same effects were recorded with hexamethonium, though ill effects were less frequent.

Acquired Hæmolytic Anæmia.

HENNING LETMAN (*Acta med. scandinav.*, Vol. 146, Fasc. VI) discusses ACTH and cortisone in the treatment of acquired hæmolytic anæmia and reports four cases. He states that in acquired hæmolytic anæmia autoagglutination of the erythrocytes often occurs, as does autohæmolysis. Other forms of hæmolytic anæmia are (i) that due to a defect in the red cells (congenital spherocytic anæmia, paroxysmal nocturnal hæmoglobinuria, sickle-cell anæmia, Mediterranean anæmia), (ii) hæmolytic anæmia due to extrinsic (physical, chemical and infective) factors, and (iii) hypersplenic hæmolytic anæmia without demonstrable immune bodies. The Coombs antiglobulin test determines the agglutinin bound to the red cells. The indirect Coombs reaction determines the agglutinin in serum. These tests are intended to demonstrate hæmolysis. The author considers these tests unreliable for the evaluation of changes in the antibodies. In the cases reported, idiopathic immunohæmolytic anæmia was diagnosed. Two patients were elderly; no cause could be found, and the anæmia did not respond to iron or liver therapy, transfusions or irradiation of the spleen. The result of a Coombs antiglobulin test was positive. Treatment was ineffective until ACTH was used. Forty units daily for ten days induced a remission. Three months later 100 units of ACTH were given daily for seven days, followed by a course of cortisone therapy, the initial dose of 200 to 300 milligrammes being later decreased. After forty-nine days a complete remission occurred. Three weeks later a severe recurrence developed. ACTH and cortisone were given again with success. Fifty milligrammes of cortisone were then given daily for 212 days, supplemented by a potassium preparation. Cortisone has been withdrawn for three months, and the patient remains well. The Coombs test response gradually became weaker. The other two patients were aged fifteen and five years respectively. They showed signs of hæmolytic anæmia (acquired). They were treated with ACTH and cortisone with good results. The Coombs test results were negative in one case and positive in the other. Twenty-eight patients with acquired hæmolytic anæmia have now been treated with ACTH or cortisone with good results in 25 cases.

Myasthenia Gravis.

D. GROB (*J.A.M.A.*, October 10, 1953) discusses the management of *myasthenia gravis*. He states that this disease is subject to spontaneous remissions. For this reason the results of treatment are difficult to determine. At the Johns Hopkins Hospital, 202 patients with generalized *myasthenia gravis* (of whom 61% were women) have been studied over thirty-four years. The average age of onset in women was twenty-eight years, in men forty-three years. One-fourth of these patients have had spontaneous remissions, and some have had several remissions lasting for from four to seventeen years. Neostigmine bromide did not influence the remissions. Patients died of the disease eventually, sometimes in a few months, sometimes after twenty-five years. Forty-four patients were subjected to thymectomy. The results show no appreciable benefit. Irradiation of the thymic region with about 2000*r* in 40 patients has brought temporary improvement, but fewer remissions. Nine patients had thymomata removed; six have died. Patients with thymomata progress rapidly as a rule. Localized ocular *myasthenia gravis* occurred mostly in men. Thymectomy and irradiation had little effect. The condition tended to spread and become general in about half the patients within two years; if not, it tended to remain localized for up to twenty-four years. Management of *myasthenia gravis* (generalized) relies heavily on neostigmine. Tetraethylpyrophosphate (TEPP) or octamethyl pyrophosphoramide (OMPA) gave better results than neostigmine generally, but possibly not so enduring. The author states that if there is no response to neostigmine, the respirator and tracheotomy may prolong life for six to twelve months. Spontaneous improvement may occur at any time.

Sympathectomy in Chronic Occlusive Arterial Disease.

W. G. KNOX AND H. PARSONS (*Am. J. Surg.*, May, 1953) present their methods of investigation, management and follow-up in a series of 32 cases of peripheral arteriosclerosis, treated by lumbar sympathectomy. Eleven of the patients were diabetics. The authors found no diagnostic tests which could accurately predict the result of sympathectomy. Arteriography and plethysmography were the most helpful. Patients with palpable pedal pulses uniformly obtained good results, but even in the absence of pulsation good clinical response was frequently obtained. Patients with occlusion of the femoral artery and with claudication as their only symptom gave good results. The authors state that it appears to make little difference whether the occlusion occurs proximal or distal to the origin of the *profunda femoris* branch. Patients with occlusion of the femoral artery and with tissue necrosis already present gave disappointing results from sympathectomy.

Exposure Method in Severe Burns.

L. M. ROUSSELOT, J. F. CONNELL AND W. P. WHALEN (*Surgery*, May, 1953) describe their management of 52 second and third degree burns by the method of exposure. Special wards were used with the windows and doors screened, and the patients were nursed on sterile sheets under a sterile tent. The details of intravenous therapy are not given. There were four deaths, one from water intoxication and three from sepsis, all in cases with greater than 50% skin burn. Infection occurred in 5% of second degree burns and 66% of third degree burns. The average stay of patients in hospital was 15·6 days for second degree burns and 45·9 days for third degree burns.

Thyroidectomy.

M. J. LANGE (*Brit. J. Surg.*, May, 1953) describes the working of the Goitre Unit at the New End Hospital, Hampstead, which consists of a physician and a surgeon, each assisted by a registrar. It is the practice of this unit to recommend surgery in practically all cases of goitre—in the non-toxic ones without preparation and in the toxic ones after adequate preparation with thiouracil and iodine. The reasons for this are many. In toxic cases (after preparation) the improvement is almost invariably dramatic; there is a very small mortality rate and a low morbidity rate. The author

and his co-workers believe that the majority of non-toxic goitres will in time become toxic and that there is a very real, though small, risk of malignant change. In a recent series of 300 consecutive cases operation was recommended in 60%. Of the 1000 cases under review, 21·9% were considered to be non-toxic; of the 78·1% toxic cases 44·4% were regarded as seriously toxic and the remaining 33·7% as minimally toxic. Of the 781 toxic cases, it was considered wise in 274 (35·1%) to prepare the patient with thiouracil. All patients were operated on under general anæsthesia. In this series of 1000 cases there were 10 deaths, five of which occurred in malignant cases. The author states that the advent of radioactive iodine may modify the view that surgery remains the treatment of choice for goitre.

Interstitial Injection of Radioactive Colloids.

F. HINMAN, JUNIOR (*Arch. Surg.*, August, 1953), reviews the recent work on the use of radioactive colloids given by interstitial injection in the palliative treatment of regional metastases. He states that if the lymphatic spread of the tumour is massive the method cannot be effective, since uniform distribution is not achieved; but if the nodes are not packed with tumour cells, interstitially injected particles will be carried to them and may destroy the fresh malignant cells. This approach is still experimental because of the possibilities of causing damage to normal tissues, such as the ureters and rectum, but it promises to be clinically useful, especially in patients with testicular tumours but without palpable nodal metastases, either as a preparation for or as a substitute for radical lymph node dissection.

NEUROLOGY AND PSYCHIATRY.

Paralysis following Saddle-Block Anæsthesia in Obstetrics.

H. E. ROSENBAUM, F. B. LONG, JUNIOR, T. R. HINCHEY AND S. A. TRUFANT (*Arch. Neurol. & Psychiat.*, December, 1952) describe six cases of chronic adhesive arachnoiditis with severe residual paralysis following spinal anæsthesia for obstetrical delivery. These cases formed 0·47% of a series in which spinal anæsthesia was used. A long latent period occurred between the anæsthesia and the onset of the first symptoms, and the authors suggest that this is the reason why so few cases are reported. They conclude that routine spinal anæsthesia in normal obstetrical delivery is too dangerous to be justifiably employed.

Psychological and Social Aspects of Psychiatric Disorders in the Aged.

M. SILVERMAN (*J. Ment. Sc.*, April, 1953) states that 96 subjects of not less than sixty-five years of age were studied and divided into four groups of 24. The divisions were as follows: normal, living at home; residents in Eventide Homes; patients in geriatric hospitals; patients in a mental hospital. The groups were matched for age, sex and socio-economic status. In all four groups the highest proportion of subjects were widowed. Evidence is produced that prolonged inactivity following the cessation of regular work and the absence of positive interests are conducive to mental and physical ill health. The evidence supports the contention that women become liable to symptoms of aging at a higher age than is the case with men. It is suggested that this is due to their being much less liable to compulsory retirement from regular work.

Mode of Action of Electro-Convulsive Therapy.

W. ROSS ASHBY (*J. Ment. Sc.*, April, 1953) states that after twenty years of research the mode of action of electro-convulsive therapy is as uncertain as ever. It seems that some of the relevant variables are interrelated in a complex pattern. The evidence that the hypothalamus is involved is based partly on the assumption that it reacts to almost every form of stress and also on the idea that current passes through the basal structures and affects the hypothalamus both directly and indirectly through cerebral connexions. The evidence that an electrically induced current affects the pituitary has been obtained mostly by observing the effects on the pituitary targets, for direct evidence of the pituitary's reaction is hardly to be obtained. A brisk outpouring of adrenal steroids has been observed during the first few days of treatment with electro-convulsive therapy. The decrease of glucose, glycogen and phosphocreatine, with increase in lactic acid and inorganic phosphate, suggests direct effect on the cerebral metabolism. ACTH and cortisone have proved ineffective in the treatment of neuroses and psychoses, and appear to play no part here. With a series of carefully controlled experiments on rats the author shows that electrically induced convulsions lower the cholesterol content of the rats' adrenals. Further experiments suggest that hypophysectomy lessens or controls the effect of the convulsion, but the factors involved need further elucidation.

The Effect of Mephenesin on Anxiety.

JOHN A. EWING AND JOHN MENDENHALL (*J. Ment. Sc.*, July, 1953) state that an experiment was devised to test the effects of mephenesin ("Myanesin" and "Tolserol") on anxiety in 159 alcoholic patients. Rigid controls were employed, involving the use of inert tablets for comparison purposes, as well as other safeguards to eliminate subjective factors on the part of examiners. With the digit span test-retest as an index of anxiety, it was found that no statistically significant diminution of anxiety was obtained with doses of up to 2·0 grammes of mephenesin given orally. In a simple *questionnaire*, patients described their subjective experiences with both active and inert tablets. The effects of suggestion were considerable throughout. Only five subjects out of 159 reported feelings indicating relaxation when receiving mephenesin; two of the 159 obtained similar relaxation effects from the control tablets. Undesirable effects from both sets of tablets were frequently encountered, such as complaints of "nervousness", "shakiness" and "weakness" in 42 of the subjective reports from patients receiving inert tablets, and in 53 from patients receiving mephenesin tablets (in each instance out of a total of 159). It is concluded, from the psychometric and clinical data obtained, that mephenesin is of little value in alleviating subjective experiences of anxiety. Lack of controls and the effect of suggestion may account for previous encouraging reports of the usefulness of mephenesin in anxiety states.

Prefrontal Leucotomy and Intellect in Chronic Schizophrenia.

PAULINE STRUCKETT (*Arch. Neurol. & Psychiat.*, March, 1953) has published *studies on 26 leucotomized schizophrenics* in which she has assessed the level of intellectual ability (by means of four psychometric tests) in the premorbid, pre-operative and post-operative phases. By comparison of the scores obtained before operation with those obtained at three weeks, three months, six months and twelve months after operation, an indication of the gains or losses in intellectual functioning was demonstrated at each period. After operation, all tests showed the same general increase in intelligence. The author states that her most important finding is the significance of the time factor in testing intervals. Three weeks after operation a decrease in intellectual functioning was apparent, but it was followed by a gradual increase, until in six months the intellectual functioning had risen to equal, if not surpass, the pre-operative level. Further increases were noticed after twelve months. This suggests that any conclusions reached before this period had elapsed would be misleading. When the intelligence of psychotic patients was compared with their pre-morbid intelligence, an impairment was exhibited. But when the study was continued over a length of time, a gradual increase was noted, exceeding the pre-operative level at least and tending to equal the pre-morbid level. The author suggests therefore that the intellectual deficit is not entirely due to the leucotomy, but may be caused in part by the deteriorating effect of the psychosis. She concludes that it would be presumptuous to say that leucotomy has no effect on intellectual functioning, but it can be stated that after a lapse of six months no adverse effects on intellectual functioning were demonstrated by the objective psychometric measures utilized in the study.

Psychodynamics in Alcoholism.

J. W. HIGGINS (*Arch. Neurol. & Psychiat.*, June, 1953) presents his views on the psychodynamics of the excessive drinking of alcohol. He outlines an hypothesis which suggests that drinking and intoxication can be put in the service of psychic defence mechanisms against various sources of anxiety. His case material, of which he presents samples, does not support a generalization that the immediate source of the anxiety is oral conflict. Instead, the anxiety being assuaged by the drinking appears to vary from one person to another. However, as the drinking episodes continue, the pleasure obtained from the intoxication can begin to supersede as goal the relief from the original anxiety. Ultimately, the psychodynamic conflict specific to the outset of the problem may be overshadowed by the "nonspecific" oral narcissistic elements.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

XCVII.

RUBELLA (GERMAN MEASLES, ROTHELN, RUBEOLA).

RUBELLA belongs to the group of diseases known as the acute exanthemata, the members of the group exhibiting a rash on the skin which is more or less typical of the particular disease. With the exception of scarlet fever all the members of the group are considered to be caused by a virus.

Rubella has a long incubation period, fourteen to twenty days, after which a brief and usually trivial illness develops with slight catarrhal symptoms, palpable enlargement of the suboccipital lymph glands and a rash consisting of relatively small discrete pink macules on face and body.

The original observations of Gregg in 1940 and the later observations of Swan and his associates, incriminating rubella in pregnancy as a cause of congenital defects such as deafness, blindness and cardiac malformation, have now been completely substantiated and accepted. The chances of such abnormalities developing are considered to be about 20% to 50% in the first three months of pregnancy; during the fourth month the risk is considerably less; after the fourth month the chances of such defects developing are considered unlikely, and for all practical purposes rubella developing in the later months of pregnancy may be disregarded.

Infectivity.

The disease is endemic in large cities, but periodical increases to epidemic proportions occur every three or four years. From 1938 to 1940 an epidemic wave swept Australia and contributed in some measure to Gregg's clinical observation in 1940, when he noted a marked increase in the incidence of congenital cataract.

Rubella, however, rarely appears to reach the same epidemic proportions as measles. This is probably due to the relative slightness of the catarrhal stage, or to a lesser infectivity of the virus. For some unexplained reason the disease appears to be less common in young children, a rather surprising finding when one considers the number of infantile rashes which are often wrongly diagnosed as rubella.

The infectious period of a rubella patient is undoubtedly brief. Although the glands may be enlarged for a period of seven days before the development of the rash, it is considered that the patient is most infectious for about two days before the rash and about two or three days after the rash.

The small number of actual cases which develop among pregnant women is in some measure due to this low infectivity and short infectious period of rubella. This should be remembered when panic measures are sought in pregnant contacts.

Clinical Features.

The important positive points in the diagnosis of rubella are as follows:

Lymphadenopathy.—Enlarged palpable and tender glands occur mainly in the posterior triangle of the neck. Particularly significant is a hard shotty and tender gland over the mastoid area. These glands are often noted for several days before the rash appears. Anderson noted in his experiments with artificially transmitted rubella in human volunteers that in one case lymphadenopathy was present seven days before the rash appeared. It was frequently noticed three to four days before the exanthema. Occasionally glandular enlargement does not occur at all.

Catarrhal Symptoms.—The catarrhal symptoms of rubella are mild, transient or even absent completely, thus differing from those in measles and constituting an important differential feature. Most patients will complain of a slight cough, some dryness in the naso-pharynx and a slight irritation or itching of the eyelids.

Rash.—The rash of rubella may be described unscientifically as being halfway between that of measles and scarlet fever with a distinct leaning towards the characteristics of the measles family. The individual lesions are smaller than measles and of a lighter pink colour, and they fade more quickly, particularly on the face. The rash on the body has a greater tendency to become scarlatiniform in type owing to the coalescence of the macules. Although some redness of the throat is noted, there is rarely any "enanthema" of the character of measles or scarlet fever. Koplik's spots are never seen in rubella. In a similar manner to that of measles the rubella rash reaches its height first on the face and neck, but may be visible there for only a short period. There is never any of the staining of the skin so characteristic of a fading measles rash.

General Symptoms.—General symptoms may be so mild that often only the appearance of the rash is responsible for the patient's suspecting that he is suffering from an infectious disease. Usually there is slight general malaise, headache and pains in the limbs. The catarrhal symptoms, as already mentioned, are rarely severe. The temperature is moderately raised at the onset and reaches normal again in about three days.

In adults there may be occasionally fairly severe joint and muscle pains developing late in the disease. A stiff neck is usually due to tenderness of the lymph glands in the neck and may produce pain on lateral movement of the neck.

Differential Diagnosis.

The conditions most likely to be confused with rubella are (i) measles, (ii) scarlet fever, (iii) glandular fever, (iv) secondary syphilis, (v) *pityriasis rosea* and (vi) food or drug rashes.

Scarlet Fever and Measles.—The main points in differentiation of scarlet fever and measles have already been indicated. It may be very difficult indeed to be sure of the diagnosis in a mild case of measles, in which occasionally slight enlargement of the cervical lymph glands simulating those in rubella may be present.

Glandular Fever.—A rash is present in a small percentage of cases of glandular fever. The blood picture is usually suggestive in this disease, and the diagnosis is confirmed by the serological Paul-Bunnell test.

Secondary Syphilis.—In secondary syphilis the rash is more persistent than that of rubella. Ulceration of the fauces, the history of a primary sore and the Wassermann test will confirm the diagnosis of syphilis.

Pityriasis Rosea.—In *pityriasis rosea* the great variation in the size of the lesions, the presence of the "herald patch" and the persistence of the rash for weeks are distinguishing signs.

Complications.

Transient joint and muscle pains are not uncommon sequelæ in adults. Encephalomyelitis is a well authenticated but rare complication. Prognosis is good.

Treatment.

Treatment is purely symptomatic.

Prevention of Rubella.

Owing to the possible disastrous consequences of infection during the vulnerable early months of pregnancy, it becomes of prime importance that pregnant women should either be immune to rubella or be protected against it if they should become contacts of an infected person.

Active Immunization.

The only known method by which a female can become actively immune to rubella is to have actually suffered from the disease. For all practical purposes it may be safely assumed that one attack of rubella confers a life-long immunity.

The deliberate infection of young female children is a clumsy but possible partial solution. Care must be taken to isolate them during the infectious period from vulnerable pregnant women.

Anderson's experiments with volunteers have shown that transmission of rubella virus with production of clinical rubella is a practical possibility. As the only known source of rubella virus is from throat washings of rubella patients, the method is open to criticism on the grounds that the throat washings could convey other virus infections of a more dangerous character than rubella. Until a technique of growing rubella virus in pure culture on egg media or tissue culture is discovered the method at present cannot be safely carried beyond the experimental stage.

Passive Protection.

Passive protection of pregnant women during the dangerous early months would seem to be the obvious alternative to active immunization. Hopes were entertained that a preparation containing the γ globulin fraction of convalescent rubella serum would confer temporary passive immunity on pregnant women who had come in contact with a person suffering from rubella.

In Victoria extensive clinical trials of this method were carried out at Fairfield Hospital in conjunction with the Red Cross Transfusion Service, the Commonwealth Serum Laboratories and the Hall Institute. The results at first appeared to be most promising, and only nine cases of rubella developed out of 700 suspected contacts. The danger of drawing conclusions from clinical trials in the absence of adequate control series was well exemplified in this series. Even after due allowance was made for a mistaken diagnosis in the original source of contact, the unknown state of immunity of the patient and the intensity or duration of contact of the infecting dose, the results still appeared to be satisfactory. It was not until two controlled studies were carried out by Anderson that considerable doubt was thrown on the efficacy of rubella convalescent γ globulin as a protective agent. In the first study globulin was administered to a group of volunteers who had been artificially infected with rubella virus. Under these conditions the globulin appeared to afford no protection. In fact the percentage of "takes" in the protected group was higher than in the unprotected controls. In a second study globulin was used in a controlled study of a natural epidemic of rubella. The results were consistent with partial protection, but the figures were not statistically significant. Korns (1952) examined three batches of γ globulin made from adult pooled serum; with only one batch was valid statistical evidence obtained of partial protection.

As a result of these investigations we must conclude that globulin as used in these conditions and in doses of four millilitres is of little or no value as a protective agent. The question whether larger or even massive doses would prevent infection cannot be answered on our present knowledge. If larger doses were used, the collection and preparation of the globulin would entail a more extensive organization. The present position in Victoria is that no further serum is being collected from patients convalescent from rubella.

Practical Problems.

What advice, then, can we offer the practitioner who is confronted with any of the following problems?

1. A Female Patient about to be Married Wishes to be Immunized against Rubella.

There is no safe method of active immunization against rubella except by the natural method of becoming infected from a known case of the disease. The advice may be given that if a case of rubella is known, the person desiring immunization should seek to make contact with the person affected as soon as possible. The risks of spreading the disease to other women in early pregnancy should be stressed. The method described must be regarded as a most unsatisfactory answer to the question, but it is the only one known to the writer on present knowledge of the disease. Incidentally, it is surprising how difficult it may be to transmit the disease successfully when contact is only temporary.

2. A Patient who is Under Four Months Pregnant Has Come into Contact with a Person Suffering from Rubella; Can Anything be Done to Protect Her from Developing Rubella?

Firstly, it goes without saying that everything possible should be done to establish the accuracy of the diagnosis of rubella. If there is room for doubt, it might be wiser to make some other tentative diagnosis. It is also obvious that if a history of a previous attack of rubella can be obtained, the patient can be completely reassured.

However, the practitioner, when faced with a knowledgeable and apprehensive expectant mother, is placed in a difficult position. He may say honestly that nothing can be done and that anyway the patient is likely to be already immune to rubella, perhaps having suffered from a previous unrecognized or subclinical attack. There is no doubt that such is the case and that a high proportion of young adults are immune. Some practitioners may prefer to inject a serum, such as adult pooled serum, either as a *placebo* or in the hope that sufficient antibodies may be present to prevent the attack. In the light of our present knowledge it must be admitted that this hope is rather a pious one. In any case, if we draw conclusions from experiences in the prevention of measles, at least 20 millilitres of adult pooled serum would be necessary, and this would mean a large and painful intramuscular injection.

3. A Patient in the First Four Months of Pregnancy Has Developed Clinical Rubella; What Can be Done?

Again it is regretted that the answer must be unsatisfactory. The writer knows of no method of minimizing the chances that a deformed child will be subsequently delivered. It is little comfort to the mother to be told that the chances of such a disaster occurring are at the most one in two, or at the least one in five.

The question of giving an immune serum at this stage has been raised in the hope that the extra antibodies will protect the developing embryo. However, when it is considered that the mother at this period, that is, when the rash is diagnosed, is developing antibodies herself at a rapid rate, it seems unlikely that the relatively small number of passive antibodies introduced in the serum will have any value. It may be of interest at this juncture to report that in the nine cases of rubella developing in pregnant women after protective γ globulin had been given, three patients had a "therapeutic" abortion performed, four were delivered of apparently normal babies, and two were not traced. It might be argued that these results are in favour of the use of an immune serum at this period, and that further work on this aspect might be encouraged.

Almost certainly some expectant mothers, when faced with the possibility of producing a deformed child, will make a request for termination of the pregnancy. Apart altogether from ethical, religious and other objections, the legal definition in Victoria is quite clear. Under the strict letter of the law pregnancy cannot be terminated unless the condition constitutes a threat to the life of the mother. However, it could be maintained on psychiatric grounds that the strain of the months of pregnancy combined with the fear of a deformed child might be sufficient to unbalance a patient and produce suicidal tendencies. The possibility of having a blind, deaf-mute child is enough to deter the bravest mother, and some sympathy must be felt with such a contention. Undoubtedly quite a number of practitioners would be in favour of a partial alteration of the legal definition. The whole question, however, bristles with ethical and religious difficulties, and no opinion of the rights and wrongs of the case should be attempted here.

Conclusion.

To sum up then, the position as regards prevention of rubella and of minimizing the chances of congenital deformities developing as a result of infection in the early months of pregnancy is still unsatisfactory. It is the opinion of the writer that the management of the problems associated with infection in pregnancy can be decided in each individual case only after due deliberation between a physician, a psychiatrist and an obstetrician.

H. McLORINAN,
Melbourne.

References.

ANDERSON, S. G. (1949), "Experimental Rubella in Human Volunteers", *J. Immunol.*, 62 : 29.

ANDERSON, S. G., and McLORINAN, H. (1953), "Convalescent Rubella Gamma Globulin as a Possible Prophylactic against Rubella", M. J. AUSTRALIA, 1 : 182.

GREGG, N. McA. (1941), "Congenital Cataract following German Measles in the Mother", *Tr. Ophth. Soc. Aust.*, 3 : 35.

KORNS, R. F. (1952), "Prophylaxis of German Measles with Human Serum Globulin", *J. Infect. Dis.*, 90 : 183.

SWAN, C., *et alii* (1943), "Congenital Defects in Infants following Infectious Diseases during Pregnancy", M. J. AUSTRALIA, 2 : 201; (1944), *ibidem*, 2 : 199.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on September 17, 1953, at Sydney Hospital. The meeting took the form of a series of clinical demonstrations by members of the honorary medical and surgical staff of the hospital. Part of this report appeared in the issue of March 20, 1954.

Accessory Uterus.

DR. H. K. PORTER and DR. A. A. MOON showed a married woman, aged forty-four years, who had been first examined on July 30, 1953, when she complained of severe dysmenorrhœa for the past year. The menstrual periods were irregular, the cycle varying from two to six weeks (usually three weeks) and the duration from one to two days with a scanty loss. The last menstrual period was on July 26, 1953. The patient had three children whose ages were twenty-one, sixteen and two years. Operation had been performed for a ruptured appendix in 1946. When examined on July 30 the patient complained of acute pain in the right iliac fossa, which had been present for seven days and forced her to take sedatives. On examination of the patient a firm regular swelling was felt through the right fornix; it was separate from the uterus, was the size of a large plum, was extremely tender and was the site of the patient's pain. It was fairly mobile, and a diagnosis of ovarian cyst was made. At operation a swelling was found on the right side of the pelvis lying midway between the uterus and the ovary but not connected with either organ. It was firm and looked like a fibroid tumour. In view of the age of the patient panhysterectomy was performed.

The swelling when incised was found to have a whorled appearance similar to a fibroid tumour, but it had a cavity in its centre containing what looked like old menstrual blood. Microscopic examination showed the cavity to be lined by tissue similar to uterine endometrium; the swelling was apparently an accessory uterus. It was interesting to note that the uterus was malformed. The right cornual region of the uterus was missing, and the absent segment corresponded in size and shape with the tumour described.

Krukenberg Tumour of the Ovary.

Dr. Porter and Dr. Moon then showed a nulliparous married woman, aged fifty-two years, who had been first examined at her home in consultation on December 24, 1952, on account of pain and swelling in the right lower part of the abdomen of five days' duration. She had been attended on several occasions during the previous three months by her doctor on account of epigastric discomfort and low dorsal backache. She was still menstruating regularly (three days' duration, twenty-eight days' interval), and the gynæcological history was normal. On examination the patient looked younger than her fifty-two years, and her general condition was satisfactory. In the right lower part of the abdomen was a visible and palpable mass, which was somewhat tender, hard, regular and mobile. There did not appear to be free fluid in the abdomen. Pelvic examination showed an anteverted uterus containing several small fibroids. The mass in the right lower part of the abdomen felt continuous with the uterus, and a provisional diagnosis was made of a large subserous fibroid with secondary changes. At operation on December 29, 1952, a little clear fluid was present in the peritoneal cavity. The abdominopelvic mass was found to be a solid, mobile ovarian tumour, the size of a fœtal head. A similar small mass was found involving the left ovary. The masses had the characteristic appearances of a Krukenberg tumour. Palpation of the stomach revealed an obvious hard growth involving most of its wall. The stomach, however, felt mobile; no glands were palpated, and no secondary deposits were felt in the liver. Panhysterectomy and bilateral salpingo-oophorectomy were performed. Convalescence was straightforward, and the patient was then examined in consultation by Dr. R. J. Malcolm, who considered that gastrectomy should be attempted. Gastrectomy was performed by Dr. Malcolm on January 9, 1953, after pre-operative treatment. The stomach was extensively infiltrated with growth, which was centred over the lesser curvature and extended almost to the cardia. There was extensive involvement of regional lymph nodes. Histological examination of the removed stomach showed a mucus-secreting adenocarcinoma with extension through the muscle coat and spread to lymph nodes.

Another patient, a married woman, aged fifty years, with six children, had been admitted to the ward from the out-patient department on February 9, 1953, complaining of an abdominal swelling present since November, 1952. Gastrectomy had been performed in 1949 for an ulcer which had been thought malignant. The patient had been able to eat only small meals since that operation and had lost weight. The patient had undergone the menopause in 1946, but had noticed slight vaginal bleeding during the past three months. The past history included cholecystectomy in 1946, gastrectomy in 1949 following X-ray investigation and gastroscopy, and removal of a melanoma of the finger nail bed in 1951. On examination the patient was found to be a thin woman. A large, hard mass was felt in the lower part of the abdomen with an irregular surface and free mobility. It measured about three inches by two inches and did not appear to arise from the pelvis or to be associated with the uterus or adnexa. A provisional diagnosis was made of secondary malignant mass involving omentum. Laparotomy and removal of bilateral Krukenberg tumours of the ovaries and hysterectomy were performed by Dr. C. E. Winston on February 11, 1953. A considerable amount of free straw-coloured fluid was present in the abdomen. Similar tumours were found arising from both ovaries with the characteristics of a Krukenberg tumour. The uterus looked normal. The ovaries were greatly enlarged and lobulated and measured 12 by 9 by 5 centimetres. Examination of the cut surface of the ovaries showed solid yellowish-white and greyish translucent tissue. Histological examination showed newgrowth infiltration of both ovaries. The cellular components were arranged in small groups and columns in a fibrous connective tissue stroma. "Signet-ring" cells were present. The appearances were considered by the pathologist to be consistent with a Krukenberg tumour. Follow-up investigation revealed that the patient's condition had been satisfactory up to August 20, 1953. She now had digestive symptoms and weakness, and in the upper end of the wound was an irregular mass which felt like a recurrence of newgrowth in the scar.

It was pointed out in a comment that the two cases were fairly typical and demonstrated numerous features of the Krukenberg tumour. The condition had been first described by Krukenberg in 1896 and was thought to be of the nature of a sarcoma on account of the marked stromal reaction and sparse epithelial reaction in some cases. The following characteristics of the tumours had been described by Krukenberg. They were firm, solid ovarian growths, usually of moderate size and invariably bilateral. They retained the general shape of the ovary, were often lobulated and had a strong capsule. They did not tend to become adherent. The cut surface varied in pattern; it might be firm, spongy, degenerated, hæmorrhagic or cystic. Ascites was frequently present. The microscopic appearances were variable. The stroma might be firm, cellular or myxomatous. Epithelial elements might occur in clusters, but always showed various degrees of mucoid change, which explained the occurrence of characteristic "signet cells". The average age incidence had been given as forty-eight years. In the Mayo Clinic report of 44 cases of Krukenberg tumour, it was stated that the diagnosis of the original lesion was made first in 30 cases and the diagnosis of the secondary lesion was made first in 14 cases. The following sites of primary lesions were listed: stomach, 20 cases; sigmoid, seven cases; colon, four cases; gall-bladder, three cases; caecum, two cases; jejunum, two cases; uterus, one case; breast, one case; hepatic duct, one case; primary not found, three cases. Leffel, Masson and Dockerty had drawn the following conclusion from their study of 44 cases: "There is as yet no general agreement as to what constitutes a Krukenberg tumour; as to how metastasis occurs; as to whether a primary ovarian carcinoma may be impossible to distinguish from a Krukenberg tumour; as to whether the metastasis is in any way selective; or on how the lesion should be treated."

Procidentia with Vesical Calculi.

The last patient shown by Dr. Porter and Dr. Moon was a married woman, aged sixty-four years, with two children (thirty-three years and twenty-four years of age). She had complained of "fallen womb" since her last confinement, the condition being much worse in the past year. She had been unable to reduce the prolapsed swelling for the past year and supported it with a towel. There was frequency of micturition (hourly by day, four-hourly at night) together with incontinence of urine. A scanty blood-stained vaginal discharge had been noticed recently. The patient had passed the menopause at the age of forty-six years. The past history was not significant, and the two confinements had been normal. On examination of the patient a complete procidentia was found supported by a towel outside the vulva forming a mass the size of a coconut. The cervix was the leading part of the mass; a large cystocele and a large enterocele were present together with some superficial ulceration of the prolapsed mucosa. Multiple stones could be felt by sounding the bladder and by vaginal palpation. The procidentia could not be reduced. On March 10, 1953, the patient was examined under anæsthesia. The prolapse was assessed, reduced and kept *in situ* by a large flavine and paraffin gauze pack. Pre-operative treatment was commenced in order to improve the condition of the vaginal mucosa. On March 18 suprapubic lithotomy was performed by Dr. K. Kirkland. Numerous facetted stones

were removed from the bladder, and suprapubic drainage was established. By April 22 the suprapubic wound had healed, the urine was clean and the patient was ready for vaginal plastic surgery. Combined vaginal hysterectomy and repair were performed, which included the cure of a large enterocele. Post-operative convalescence was normal, and the patient passed urine normally after removal of the Foley catheter on the fourth day. She was allowed out of bed on the twelfth day after operation. Subsequent examination two months after the patient's discharge from hospital showed a satisfactory result of the operations and normal urinary function.

Dermatological Cases.

DR. FRANK SMIDLIN showed three patients suffering from dermatological conditions. The first was a child, aged thirteen years, who had had scleroderma of the thigh, leg and foot, for which treatment was given with cortisone. The second patient was a man, aged fifty-four years, who had had numerous areas of superficial erythematous basal-cell carcinoma of the trunk and arms. Treatment had been given by means of irradiation and carbon dioxide snow. The third patient, a man, aged sixty-six years, had had numerous areas of hyperkeratosis of the forearms and hands, a large cutaneous horn of the hand, two basal-cell carcinomata of the forearms and a basal-cell carcinoma on the face.

Ophthalmological Cases.

DR. W. DEANE-BUTCHER showed two patients suffering from ophthalmological conditions. The first was a married woman, aged thirty-two years, who had sustained a ruptured uterus during the eighth month of pregnancy, with subsequent extreme exsanguination. A hysterectomy had been performed and she recovered, but with complete loss of vision in the left eye and loss of all useful vision in the right eye; there was perception of hand movements only in the extreme temporal periphery of the right field. Examination of the ocular fundi revealed optic atrophy, extreme attenuation of the retinal arteries, and gross pigmentary disturbance of the entire surface of both retinæ. The patient had two children, both of whom had been born prematurely.

The second patient was a man, aged thirty years, who suffered from keratoconus, which reduced his vision to below 6/60 in each eye. He wore contact lenses, which improved the vision to 6/12 in each eye. His occupation was coal-mining, and he wore his lenses to work.

Pott's Disease.

DR. WARWICK STENING showed a man, aged thirty-two years, who had been suffering from active Pott's disease of the first and second lumbar vertebræ. His symptoms had been present for one year prior to his admission to hospital in February, 1953, when operation was performed. For one week prior to the operation and for four weeks after it the patient received streptomycin and PAS. At operation, spinal fusion was performed and a vitallium plate was fixed to the spine of the twelfth dorsal and the first, second and third lumbar vertebræ. In addition, the laminæ and spine were bared, and cancellous bone from the posterior iliac crest was packed in. The patient was nursed on a Rota frame bed. During the second week of convalescence he developed a volvulus of the colon, which necessitated laparotomy. Despite that happening, he was allowed up out of bed wearing a spinal brace six weeks after the fusion operation and was discharged from hospital one week later. Subsequent X-ray examinations at intervals of about six weeks showed that fusion was complete between the vertebral bodies after five months. The patient resumed work as a waiter one month later. Dr. Stening said that the patient had been shown to demonstrate the efficiency of metallic fixation in combination with bone grafting in cases of infective lesions of the spine. Although the plate would probably work loose in time if fusion did not occur, the absolute immobilization of the affected vertebræ hastened the fusion process both posteriorly and between the affected vertebral bodies.

Fibrocystic Disease of the Talus.

The second patient shown by Dr. Stening was a girl, aged sixteen years, who had undergone routine X-ray examination after she had sprained her right ankle. The examination revealed a large single cyst in the body of the talus bone. Although the cyst occupied almost the whole of the talus, it was apparently quite symptomless. However, in view of the probability of the collapse of the bone, with consequent disorganization of the ankle and subtaloid joints, it was decided to operate. In July, 1953, operation was performed through an anterior incision. The anterior portion of the neck of the talus on the superior surface was entered with a drill penetrating to the cyst cavity. The opening was carefully widened, but was kept extraarticular. The cyst was found to contain neither lining membrane nor contents. The walls were scarified as thoroughly as possible through the limited opening, and cancellous bone from the iliac crest was packed in firmly. A plaster cast was applied for six weeks followed by a short double iron, which the patient was still wearing. X-ray examination in September, 1953, revealed that the grafts had nearly completely fused and obliterated the cyst cavity. At the time of the meeting there was still some limitation of ankle movement, but the patient's condition was improving, and she was to commence physiotherapy to assist in mobilizing the joint.

Osteoclastoma of Femoral Neck.

The last patient shown by Dr. Stening was a married woman, aged thirty-five years, who had been found at X-ray examination to have a tumour in the neck of the left femur. A biopsy was performed, and the lesion was reported as being an osteoclastoma with no obvious malignant characteristics. Considerable replacement of the neck of the femur had occurred, and there was present only a small shell of bone on the superior aspect of the neck of the bone. The tumour extended into the head of the bone and also well into the trochanteric region. The deep X-ray therapy department was consulted, and their opinion was that X-ray therapy was inadvisable because of the great risk of promoting pathological fracture and non-union. In view of that opinion, operation was undertaken. The tumour was approached through an anterior Smith-Petersen incision, and the hip joint was widely opened. The tumour was curetted out, and a cancellous graft was taken from the anterior iliac crest. Two struts were made without the removal of cortical bone, and those were fitted across the inferior aspect of the neck, extending well into the head of the femur and into the medullary region of the upper part of the femur. The rest of the cavity was packed with cancellous chips from the same source. The patient was nursed on a double abduction frame with extension of both legs. Despite that, X-ray examination two weeks after operation revealed a crack through the remaining part of the neck of the femur. However, union had occurred eight months after operation, a moderate degree of *coxa vara* being present, and at the time of the meeting the patient was ambulant and wearing a non-weightbearing calliper. There was no evidence of recurrence of the tumour nine months after operation.

Plantar Digital Neuroma.

DR. A. I. RHYDDERCH showed a woman, aged forty-two years, who had suffered from pain in the left foot for some years, much worse over the past twelve months. The pain was felt in the region of the third and fourth metatarsal heads, radiating to the corresponding toes. It was precipitated by weightbearing and relieved by rest. Recently, when walking, she had had to stoop and remove her shoe for some minutes to ease the pain before proceeding. On examination of the patient, the foot was found to be broad and mobile. Extreme tenderness to pressure was experienced over the cleft between the third and fourth metatarsals on the plantar aspect. There was a painful click when the forefoot was squeezed. There were no sensory changes in the toes. The peripheral pulses were present. On April 10, 1953, the space between the third and fourth metatarsals of the left foot was explored through a dorsal incision. A typical plantar digital neuroma was isolated and removed, with, as a result, complete relief from pain. Dr. Rhydderch said that although the condition had been originally described by an Australian, knowledge of the lesion was not widespread. The dorsal approach provided ready access and was preferable to the approach from the plantar surface of the foot.

Recurrent Dislocation of the Patella.

Dr. Rhydderch also showed a woman, aged thirty-five years, who had attended the hospital out-patient department on April 24, 1952, with a history that both knees had "let her down" over the past five or six years, the left more than the right. She stated that she might be walking along, when the knee would give way and she would fall to the ground. There was immediate pain on the outside of the knee, the kneecap being more prominent on the outer aspect of the knee. The patient was unable to extend her knee

until dislocation of the patella was reduced with an obvious click by her own manipulation. Swelling commenced one or two hours after the incident and generally lasted for ten to fourteen days. The patient now had constant pain localized to the front of the knee. On examination of the patient a mild degree of *genu valgum* was noted, with considerable lateral mobility of the patella. On flexion of the knee, the patella was found to move laterally far beyond the normal excursion. Pressure of the patella against the femur was painful, and mild retropatellar crepitus could be felt. On July 25, 1952, patellectomy was performed. The cartilage was found to be fibrillated. Dr. Rhydderch said that the patient now had a stable painless knee with a full range of active movements. Patellectomy was probably the best treatment for a recurrent dislocation of the patella in the adult.

Bilateral Osteochondritis Dissccans.

The last patient shown by Dr. Rhydderch was a lad, aged sixteen years, who had first attended the out-patient department in July, 1951, complaining of intermittent pain in the knees for some years. The knees became stiff and painful if the patient sat for any length of time. X-ray examination revealed classical *osteochondritis dissecans* of both medial femoral condyles with the avascular segments *in situ*. Dr. Rhydderch said that the patient had been under observation for the past two years and had been treated by restriction of his activities only. The latest X-ray examination in August, 1953, had revealed that the lesion on the left side was no longer apparent. In the right knee a discrete fragment was still visible. The knees were both symptomless.

Radiotherapy Demonstration.

DR. F. DUVAL and DR. R. C. SCOBIE showed a man, aged forty-five years, who had been referred to the radiotherapy department from the pulmonary clinic in June, 1953. His symptoms, over some eighteen months, had been loss of one and a half stone in weight, slight anorexia, exertional dyspnœa and some cough with a little sputum. X-ray examination of his chest showed a picture highly suggestive of either sarcoid or reticulosis. There were no other physical findings to assist in the diagnosis of either disease, and X-ray examination of the hands showed no abnormality. Sputum tests, blood counts and sedimentation rate estimations were of no assistance. It was decided to administer X-ray therapy to the hilar glands. A tumour dose was given of approximately 2000*r* in four weeks. X-ray examination of the patient's chest at the end of treatment showed great improvement. He had lost all his symptoms and had returned to work. He was presented to the meeting for discussion in relation to diagnosis.

The second patient presented by Dr. Duval and Dr. Scobie was a man, aged twenty-six years, who had been first examined in July, 1953, when he had presented a typical picture of advanced ankylosing spondylitis. There was considerable fixity of the spine, kyphosis and limited chest expansion. The blood sedimentation rate was six millimetres in one hour, and it appeared radiologically that the disease was localized to the sacro-iliac joints. X-ray therapy in a dosage of 2000*r* was administered to the sacro-iliac joints and the whole spine over a period of six weeks. At the same time, the patient was given 10 milligrammes three times a day of ACTH to a total dosage of 700 milligrammes. The patient had experienced a great improvement, had lost all pain and was now able to touch his toes.

Dr. Duval and Dr. Scobie then showed a man, aged fifty-five years, suffering from acromegaly. The patient had been referred from the neurosurgical department in July, 1952. His history had extended over three or four years, and consisted of headaches, poor memory, slow cerebration, increased appetite and loss of libido. He presented a typical picture of acromegaly. X-ray examination of his skull showed a huge pituitary fossa, and there was associated *diabetes insipidus* with a left superior nasal visual field defect. X-ray therapy was administered to the patient's pituitary fossa by five fields, in an approximate tumour dose of 5000*r* over a period of eight weeks. Since that time he had improved vastly in every respect and had lost his symptoms.

Dr. Duval and DR. R. RAWLE showed a woman, aged sixty-five years, who had been suffering from carcinoma of the thyroid with bone metastases. The patient had been first examined in February, 1953, when she stated that she had noticed a small swelling in the region of the thyroid gland for some three years. She had sought medical attention and had been reassured. She then noticed pain and loss of power in her right arm, and X-ray examination showed an area of osteolytic metastasis in the neck and shaft of the right humerus. She received X-ray therapy to that region between February 18 and 27, 1953, by two fields (a 1600*r* skin dose to each field), and in view of the notable response, thyroidectomy was undertaken in May, 1953. The gland was successfully removed, and histological examination showed carcinoma in which veins were invaded. As it appeared very likely that further metastases were present, a tracer dose of radioactive iodine was given. That showed a high uptake over the right and left ilium, the upper part of the right lung, the sternum and the right occiput. Skiagrams of those areas, however, revealed no abnormality. Further treatment with radioactive iodine was given in July, 1953, and at present the patient felt quite well, apart from occasional headaches. Further X-ray examinations had shown no recent metastases. The patient was presented to the meeting to illustrate the combined radiotherapeutic and surgical attack on a widespread neoplasm, including the use of radioactive isotopes.

Paper Electrophoresis.

DR. H. S. H. WARDLAW demonstrated a simple apparatus for separating serum proteins into the fractions albumin and α_1, α_2, β and γ globulins by means of their different rates of migration along a moistened paper strip when subjected to an electrical potential gradient (paper electrophoresis). Examples were shown of strips with the protein fractions stained to render them visible, and of curves obtained from them by photoelectric analysis. Variations were illustrated between the normal proportions of serum protein fractions and proportions found in different diseases.

Demonstration of Flame Photometer.

DR. G. J. CLOWES demonstrated the E.E.L. flame photometer. The principle of the apparatus was discussed and its particular features were illustrated. Its use in the control of electrolyte therapy in medical and surgical cases was discussed and illustrated by balance studies presented graphically. Dr. Clowes said that studies carried out on patients following gastrectomy supported findings of overseas workers (Moore *et alii*) in showing a negative potassium and positive sodium balance for five to seven days after operation. Patients with paralytic ileus and gastric dilatation, losing up to 150 milliequivalents of sodium and potassium daily, so that massive intravenous therapy was necessary, showed surprisingly normal serum values. Results indicated that in those cases electrolyte requirements should be assessed on estimated losses, and that serum levels be used as a guide to major deficiencies and as a safeguard against over-administration.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Women's Hospital, Crown Street, Sydney, on October 22, 1953. The meeting took the form of a series of clinical demonstrations by members of the medical and surgical staff of the hospital.

Pregnancy and Carcinoma of the Cervix Uteri.

DR. JOHN CHESTERMAN presented the case history of a Dutch woman, aged twenty-six years, who had been referred to him about six weeks before the time of the meeting. She had been married in 1948, and since no pregnancies had occurred after four years of marriage, early in 1952 she had sought investigation of her sterility. Complete investigation had been carried out on both her and her husband. The husband proved normal, but the patient had patency of only one Fallopian tube and chronic cervicitis associated with persistent purulent vaginal discharge. In August, 1952, the cervix had been cauterized. Since no pregnancy had occurred during the following ten months, she had sought medical advice again, complaining of profuse white vaginal discharge and about six weeks' amenorrhœa. The examining doctor found a small, hard, crateriform ulcer on the posterior lip of the *cervix uteri*, extending to the vaginal wall posterolaterally and to the left. Biopsy of the ulcerated area made on July 8, 1953, proved it to be a squamous carcinoma, the cells being very anaplastic and invading the connective tissue stroma and lymphatic vessels. The diagnosis was made of carcinoma grade II and early pregnancy. On July 13 the cervix was dilated and a very early pregnancy removed from the uterus by curettage; three days later radium therapy was instituted. Thirty milligrammes of radium were inserted in the uterus and cervical canal and 20 milligrammes in each fornix, suitably screened. The radium remained *in situ* for seventy hours, giving a dosage of 7000 milligramme-hours.

Dr. Chesterman said that two weeks later a follow-up biopsy of the irradiated cervix was made, and the pathologist gave the following report: "Necrotic surface stroma is heavily infiltrated by leucocytes and a moderate number of degenerate carcinoma cells. Deeper, very bizarre carcinoma cells which show degenerative changes, can be made out. No indistputably viable cells can be seen."

It was at this time in the patient's history that she had been referred to Dr. Chesterman for further treatment, and he considered that the radium therapy should be followed by Wertheim hysterectomy, which he performed on September 17. At operation, which the patient stood well, he had removed enlarged lymph glands from the common iliac vessels on both sides. Microscopic examination of the lymph nodes showed large metastases of anaplastic squamous epithelial cells, and in the cervix of the removed uterus at one site in the connective tissue, a single solid alveolus of slightly anaplastic squamous cell was discovered.

Dr. Chesterman said that he considered the prognosis to be very unfavourable, and it was the opinion of a radiotherapist, sought in consultation, that a course of deep X-ray therapy would not improve it.

Dr. Chesterman said that he wished to draw attention to some points of interest in the case history. The first point was the youth and nulliparity of the patient. The carcinoma had undoubtedly preceded the pregnancy, and yet the patient had been trying for five years to become pregnant. Next, he wondered whether the so-called chronic cervicitis had been an innocent lesion only or whether it had masked carcinoma *in situ*, and in that case whether the cauterization or more possibly the pregnancy had played a part in starting its invasive activity. He referred to the failure of a post-radium biopsy to reveal the fact that there were still active carcinoma cells in the cervix, and pointed out that such a biopsy might be misleading, since only a small area of cervix was excised. As was to be expected from the youth of the patient and the type of carcinoma cell, glandular metastasis had occurred early, and for that reason he had considered that a Wertheim's hysterectomy with wide lymphadenectomy offered the only chance of cure.

Discussing the management of carcinoma of the cervix (grades I and II) and pregnancy in the first three months, Dr. Chesterman outlined the following possible methods of treatment: (i) Destruction of the early fœtus by deep X rays, followed by application of radium after the pregnancy had aborted. (ii) Termination of the pregnancy by curettage, followed by application of radium—a method criticized by some authorities on the grounds that dilating the cervix might press cancer cells into lymphatics or blood vessels and facilitate dissemination. (iii) The application of radium, the presence of the pregnancy being ignored—a method favoured by Heyman, of Stockholm, who reported 28 cases with a 57% survival rate after five years. Dr. Chesterman said that, if considered advisable, Wertheim hysterectomy could follow any of the procedures mentioned. Finally, some authorities had recommended the radical Wertheim operation, the early pregnancy being left *in situ*.

In conclusion, Dr. Chesterman said that only by very early detection of the carcinoma could the prognosis for the patient be made favourable, and he made a plea for greater use of the speculum in inspecting the cervix in all cases of slight vaginal bleeding during pregnancy.

Intermittent Albuminuria due to Renal Calculus.

DR. DAVID MCGRATH discussed the case of a woman, aged forty-two years, who reported to the out-patient department at Crown Street when she was ten weeks pregnant, the pregnancy being her fifth. Examination findings were normal except that her urine contained a cloud of albumin. On the next visit, her urine was normal; but when albuminuria again presented on a subsequent visit, she was admitted to hospital for investigation. Examination of a catheter specimen of urine showed numerous pus and blood cells per high-power field, with a heavy growth of *Staphylococcus albus* on culture. The urea concentration test result was within normal limits, but microscopic examination of the urine suggested renal damage. Plain X-ray examination of the abdomen revealed a calculus the size and shape of an almond in the pelvic area of the right kidney. An excretion pyelogram revealed dilatation of the calices on that side, and a "Y"-shaped pelvis of the kidney on the left side. Cystoscopy was performed, and indigocarmine did not appear from the right ureter until twelve minutes after injection. It was felt that there would be a danger of the calculus slipping down into the ureter as it dilated during pregnancy, but that did not occur; and X-ray examination and excretion pyelography carried out eight weeks *post partum* showed the calculus in approximately the same position. Dr. McGrath said that the case illustrated the advisability of full investigation in any case of persistent albuminuria.

Pyrexia in the Puerperium, due Probably to Infective Hepatitis.

Dr. David McGrath also presented details of a case in which a woman, aged twenty-five years, in the last weeks of her first pregnancy, developed signs of toxæmia. She came into labour normally three weeks before her estimated date of confinement, and during her first and second stages of labour continued to vomit copious amounts of greenish-yellow fluid. Her pulse rate rose to 120 per minute, and dextrose 5% in distilled water was administered intravenously. She had a normal delivery of a female child under light chloroform anæsthesia. *Post partum* the patient developed pyrexia, her temperature rising to 102·6° F. on the evening of the second day. The only abnormal physical findings were phlebitis in the right long saphenous vein and a few scattered crepitations in the upper zone of the left lung. A small pulmonary embolus was suspected, and X-ray examination of the lungs showed segmental collapse in the upper zone of the left lung. However, the patient had no pulmonary symptoms and no blood-stained sputum. On the fourth day *post partum* the patient was tender in the epigastrium and hepatic area, and looked a little jaundiced. The urine was dark, and bile was present.

Dr. McGrath said that the differential diagnosis included phlebitis, with pulmonary embolus, *Clostridium welchii* infection, chloroform poisoning, acute yellow atrophy of the liver, acute cholecystitis and infective hepatitis. The only significant findings on investigation were the rise in serum bilirubin content to 1·6 milligrammes per 100 mils, and the thymol turbidity of four units. It was thought that the diagnosis was most likely infective hepatitis. All chemotherapy was suspended, the temperature became normal within a few days, and the patient's condition rapidly became normal. The result of a Graham's test twelve weeks *post partum* was normal, and there were no opaque calculi seen in the gall-bladder on plain X-ray examination.

Adenocarcinoma of the Uterine Body Supervening on Hyperplastic Endometrium.

DR. K. MCGARRITY presented details of a case of adenocarcinoma of the body of the uterus supervening on hyperplastic endometrium. The patient, a woman, aged fifty-six years, who was some four years past the menopause, had suffered with slight vaginal bleeding for the past six weeks. On examination of the patient, no evidence of pelvic abnormality was found other than very slight bleeding from the uterine cervix. Diagnostic curettage revealed only a thickened endometrium, examination of which showed changes indicative of early adenocarcinoma supervening on hyperplastic endometrium.

Dr. McGarrity pointed out the danger of missing the diagnosis in such cases and of the serious sequel so often associated with such hyperplasia of the endometrium. He showed slides illustrating this point—first, a slide showing a hyperplastic endometrium which was quite innocent, and then a section illustrating the microscopic details of the case just described and showing early adenocarcinomatous changes alongside a hyperplastic endometrium. He then showed a third series of slides, which showed frank adenocarcinoma of the body of the uterus beside a hyperplastic endometrium.

Dr. McGarrity referred to a recent investigation of cases of hyperplasia of the endometrium which had been followed up after treatment. The investigation showed that all patients who had been operated on or treated by irradiation had remained well, and of the remainder 45% were free of symptoms after a simple diagnostic curettage. One-half of the remaining 55% developed adenocarcinoma of the endometrium. The high incidence of adenocarcinoma of the body of the uterus which had supervened on a diagnosis of hyperplasia of the endometrium showed the great need for either radical measures in dealing with such cases or else the most careful follow-up.

The Dangerous Sacrum.

DR. R. D. MACBETH showed X-ray plates illustrating deformities of the sacrum which caused difficulty during delivery. The first showed well-developed spondylolisthesis in a *primipara*, aged thirty-three years. The external pelvic measurements gave no indication of the obstruction present at the pelvic brim. Pelvic examination was carried out early in

labour when it was found that the head was not engaging. It was then found that the antero-posterior diameter of the outlet was contracted and the sacro-spinous ligaments were short, and when the promontory was felt for, a large irregular mass was found. This appeared on X-ray examination as the fifth lumbar vertebra. Cæsarean section was performed, and a baby was delivered weighing six pounds eight ounces. Dr. Macbeth commented that thorough pelvic exploration in the ante-natal period would have elucidated the problem and saved a great deal of trouble in the early hours of the morning to a number of people.

Dr. Macbeth then showed X-ray plates illustrating what he called "the dangerous sacrum". He pointed out that disproportion at the brim and contraction at the pelvic outlet should be easily recognized, but in certain types of pelvis—usually the non-rhachitic flat types—the upper sacral segments formed a straight line instead of being concave to the pelvic cavity. In those cases the antero-posterior diameter from the back of the symphysis to the front of the first two or three sacral bodies might remain the same or even become shorter. Progress of the head through the pelvis, of course, depended on the shape and dimensions of the pelvis in all its diameters, as well as the size of the baby, the mouldability of the skull and the power of the contractions. In the cases discussed by Dr. Macbeth the major obstructive factor appeared to be in the region of the first and second sacral vertebræ. He said that in those cases the fœtal head almost always entered the brim in the transverse diameter, and descended further than usual in that position without rotation, because of the continuing shortened antero-posterior diameter. There was often a false promontory at the junction of the first and second sacral vertebræ. The transverse and oblique diameters were usually not diminished. The danger in such cases was that external pelvimetry rarely gave any indication of the problem, and the measurements at the brim being reasonable, the head began to descend. But having passed a short distance into the pelvis, the head was obstructed on the false promontory in the transverse position. It might not be recognized clinically that the effective brim was possibly one and a half inches lower in the pelvis. Rotation of the head might be rendered very difficult and forceps delivery prove far more hazardous than was expected and even fail.

Dr. Macbeth then showed two X-ray plates. In the first case forceps delivery had failed with an eight-pound baby, which was eventually delivered stillborn after version. There had been thirty-three hours' labour. In the second case there was an even more contracted antero-posterior diameter due to a forward-placed straight sacrum. After a difficult rotation and forceps application a seven-pound baby was delivered safely. In both cases descent had started and the extent of the high mid-pelvic obstruction was not fully appreciated.

Dr. Macbeth pointed out the importance of a thorough pelvic examination some time after the thirtieth week of pregnancy to assess the sacral contour and the nature of the promontory. He said that at that stage the perineum was soft and deeper palpation was possible than earlier in the pregnancy. If there was any reasonable possibility that mid-pelvic contraction existed, X-ray examination of the brim with a lateral view of the sacral curve might prepare the *accoucheur* for the problems associated with "the dangerous sacrum".

The Use of Nor-Adrenaline.

Dr. R. B. C. Stevenson presented a case history illustrating the use of nor-adrenaline. The patient, a woman, aged thirty-one years, was pregnant for the third time. Her first baby had been stillborn at full term in December, 1949, as a result of a shoulder presentation with prolapsed arm when the cervix was three to four fingers dilated. The condition was treated by bipolar podallic version with breech delivery twelve hours later. The second pregnancy had resulted in a normal full-term delivery in December, 1950. In the third pregnancy the last menstrual period had ended on November 27, 1952, and the expected date of confinement was September 9, 1953. The patient was admitted to hospital at 12.45 p.m. on September 7, 1953, in the early stages of labour. The pregnancy had been complicated by obesity, and her blood pressure readings had risen from 110 millimetres of mercury, systolic, and 66 millimetres, diastolic, to 130 millimetres of mercury, systolic, and 90 millimetres, diastolic, during the ante-natal period. The fœtus appeared to be presenting by a vertex, but the presenting part was very high and the pains were weak and irregular.

About twenty-four hours later the pains became more definite, and the patient was transferred to the labour ward. The membranes ruptured at 7.35 a.m. on September 9. A vaginal examination performed five minutes later revealed a prolapsed arm and a prolapsed pulsating cord with a thick cervix showing four fingers' dilatation. The cervix was gradually manually dilated, and bipolar podallic version was performed, followed by breech extraction with mediolateral episiotomy. A female baby was born at 8.15 a.m., showing *asphyxia livida*. The baby responded to resuscitation measures and subsequently did very well.

After the placenta had been expressed, the mother's blood loss was noted to be 18 ounces and her blood pressure was 130 millimetres of mercury, systolic, and 80 millimetres, diastolic. One hour later a large clot was expressed followed by a continued trickle of blood from the vagina. By 11.30 a.m. the pulse rate was 130 per minute and the blood pressure was 104 millimetres of merury, systolic, and 60 millimetres, diastolic. Examination under anæsthesia revealed an empty intact body of the uterus, but a tear in the posterior part of the cervix was noted. The rate of bleeding prevented suture of the cervix, so the uterus and vagina were packed with gauze. Blood transfusions which had been previously started were continued.

At 12.30 p.m. the patient was bleeding through the packing, and Dr. Stevenson was asked to see her in consultation. Her blood pressure had picked up to 120 millimetres of mercury, systolic, and 90 millimetres, diastolic. She was taken to the operating theatre, where the cervix was sutured by the doctor in charge of the case, and the packing was reinserted as there was still considerable bleeding.

At 5.20 p.m., as bleeding was still continuing and the patient's condition was deteriorating, as evidenced by a pulse rate of 150 per minute and a blood pressure of 88 millimetres of mercury, systolic, and a doubtful diastolic reading, Dr. Stevenson was again asked to see the patient in consultation. She was taken to the operating theatre, and under anæsthesia the cervix and vagina were explored. The tissues were soft and friable and would not hold sutures, and the bleeding appeared to be generalized. Her condition would not have stood hysterectomy, so the uterus and vagina were packed very firmly with seven rolls of five inch gauze tied together.

At the end of the operation the blood pressure could not be recorded, despite the fact that two bottles of blood were running in at the one time under positive pressure. The administration of the seventeenth bottle of blood was commenced in the theatre. The blood loss from the patient seemed now to be controlled, but the patient's general condition was not improving, so a nor-adrenaline drip administration was commenced. Ten minutes later the blood pressure was 110 millimetres of mercury, systolic, and 90 millimetres, diastolic, and one hour later it was 120 millimetres of mercury, systolic, and 80 millimetres, diastolic; half an hour later it fell to 90 millimetres of mercury, systolic, and 80 millimetres, diastolic, but when the rate of flow of the nor-adrenaline drip administration was increased, the pressure returned to 120 millimetres of mercury, systolic, and 90 millimetres, diastolic, and it was maintained at about 110 millimetres of mercury, systolic, and 80 millimetres, diastolic, to 120 millimetres of mercury, systolic, and 90 millimetres, diastolic, for the next twelve hours by continuing the blood transfusion and the nor-adrenaline drip administration. The gauze was removed from the vagina twenty hours after insertion, and the patient subsequently made a complete recovery. In all, twenty-two bottles of blood were given.

Dr. Stevenson said that the patient appeared to have entered the stage of irreversible shock due to blood loss, and it was considered that transfusions alone without the nor-adrenaline might not have saved her life. Going on to a general consideration of nor-adrenaline, Dr. Stevenson said that it was an amine and, like adrenaline, was a neurohormone. At the NH_2 group in the formula for adrenaline, one of the hydrogen atoms attached to the nitrogen was replaced by a methyl radical (CH_3), whereas in nor-adrenaline that radical was lacking.

Nor-adrenaline was now considered to be the activator substance liberated at the nerve endings of the sympathetic nervous system. Its action differed from that of adrenaline in several important respects. Unlike adrenaline, it did not increase the cardiac output, nor did it increase the blood flow through the liver, brain and skeletal muscle. It did, however, increase the total peripheral resistance, whereas adrenaline in physiological doses decreased that resistance. Adrenaline accelerated the heart rate, nor-adrenaline slowed it. Both increased the venous pressure and the pressure in the pulmonary artery. Adrenaline increased the systemic systolic pressure, but its effect on the diastolic pressure was variable or absent. It thus increased the pulse pressure,

but increased the mean pressure by only a little. Nor-adrenaline, on the other hand, increased the systolic and diastolic pressures and increased the mean pressure considerably, but did not increase the pulse pressure.

Dr. Stevenson said that from these observations it would be seen that nor-adrenaline was the agent of choice in cases of vasomotor collapse due to peripheral circulatory failure. It might be used with advantage in cases of severe hypotension following: (i) sympathectomy, (ii) sympathetic block by hexamethonium bromide, (iii) the administration of relaxant drugs during anæsthesia, and (iv) shock.

Nor-adrenaline was supplied as the lævo-bitartrate under the name of "Levo-phed" (Stearns) in ampoules containing one milligramme in one mil, and was usually administered at the rate of one microgramme per kilogram of body weight per minute. In practice, two ampoules of "Levo-phed" were added to 500 mils of normal saline or other suitable fluid, and the rate of intravenous drip administration was adjusted according to the blood pressure response.

Sloughing of the tissues and of the vein at the site of injection was particularly prone to occur as a result of vasospasm, and the wound might take months or years to heal. In order to lessen the risk of that complication it was advisable to pack hot water bags round the area of injection and to maintain as slow a rate of drip as possible consistent with the clinical condition of the patient.

Ectopic Pregnancy.

DR. ALAN GRANT said that it was a common thing for the occurrence of an ectopic pregnancy to be regarded as an unlucky but temporary event. The patient was cheerfully told that she could have another pregnancy at a later date. However, the study of a large number of cases would show that only about 40 out of every 100 women who had had an ectopic pregnancy would give birth to a living baby during the rest of their reproductive lives. It would appear that ectopic pregnancy was a reproductive disaster of considerable magnitude.

Dr. Grant went on to say that in a group of 102 cases of ectopic pregnancy met with in the ordinary gynæcological department, he had found that only about half of the women concerned had become pregnant since their misplaced pregnancy, and only 40 of those who became pregnant had produced living babies. He had investigated a further and different group of 135 women who had presented themselves at the sterility clinic suffering from an inability to become pregnant. He had analysed the group and found the following causes of sterility after ectopic pregnancy: blocked residual Fallopian tube, 59; hydrosalpinx (patent), six; peritubal adhesions, 13; tubal stenosis (no peristalsis), 11; severe tubal spasm (permanent), two; doubtful cause (pregnancy followed one Rubin's test), 17; male sterility, seven; anovulation (permanent), three; poor premenstrual endometrium, two; cervical barrier (residual tube patent), 12; secret contraception, two; endometriosis, one.

Dr. Grant drew attention to the fact that in 67% of cases the patients had a severely damaged residual Fallopian tube. The incidence of suspected tubal damage was higher (namely, 81%), but the higher figure could not be proved, as 17 women had promptly become pregnant after the performance of one Rubin's test. In that group tubal damage was suspected. Other than tubal damage the main causes of failure to become pregnant were the onset of sterility in the male (no sperms) and the occurrence of a cervical barrier to spermigration in the female (18 cases). Permanent anovulation accounted for three cases, defective secretory endometrium for two cases, secret contraception for two cases (due to fear of pregnancy) and endometriosis for the remaining one case.

Dr. Grant then presented a third and additional group of 26 patients who had all suffered from a residual blocked Fallopian tube following an ectopic pregnancy and whose Fallopian tubes had been examined radiologically both before and after the occurrence of the misplaced pregnancy. He stated that in 13 (or one-half) of those cases the blockage in the residual tube had occurred after the operation for the ectopic pregnancy. There therefore appeared to be some fault in the present post-operative treatment of many such patients.

In conclusion he said that his talk was meant to illustrate two points. The first was that most women who failed to become pregnant after an ectopic pregnancy had a blockage in their residual Fallopian tube. The second was the suggestion that no patient had been properly treated for an ectopic pregnancy unless her one remaining Fallopian tube had been protected against infection by antibiotics in the post-operative period and finally proved patent by a tubal patency test.

In reply to questions Dr. Grant said that lipiodol granulomata had not been identified in any Fallopian tubes removed, although the hospital pathologist, Dr. Murray Moyes, was always alert in looking for them. Some granulomatous lesions had remained unidentified, but were thought to be atypical forms of pelvic tuberculosis. Dr. Grant also said that the cause of the block in the residual Fallopian tube was prevented by the administration of antibiotics and was therefore presumably of bacterial origin and not due to a hæmatosalpinx.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Royal Children's Hospital, Melbourne, on Wednesday, October 14, 1953.

Gangrene of the Foot in a Newborn.

DR. K. J. RENNIE presented the case of a premature male baby, weighing four pounds thirteen ounces, who had developed a gangrenous left foot shortly after birth. The baby, who had been three weeks premature, was admitted to hospital at the age of twelve hours. The pregnancy and labour had been uneventful, and no anæsthetic had been administered. There was no neonatal distress, and the only treatment was an injection of "Synkamine" into the lateral aspect of the left thigh. Eight hours after birth it was noticed that the left foot was dark and slightly swollen. An hour later the discoloration and swelling had increased and the general condition had deteriorated, and five hours later the foot was gangrenous. The baby was transferred to the Queen Victoria Hospital. The only abnormalities found on admission were slight generalized œdema and a grossly swollen, œdematous, purplish-black left foot except for a strip along the medial aspect of the dorsum and sole, where the skin was red. A bluish discoloration of the skin extended to just below the left knee. The foot appeared to be extremely painful. In addition, the right foot was blue with poor circulation but no swelling. Both feet were cool. The peripheral pulses in both legs were not palpable. The findings from an electrocardiogram, a blood sugar concentration test, urine analysis and blood Wassermann and Kahn tests were negative. A clinical diagnosis was made of gangrene of the left foot and circulatory embarrassment of the right foot. It was considered that the ætiology was either a retrograde thrombosis extending from the umbilical arteries, or a thrombus from a patent *ductus arteriosus* which had lodged at the aortic bifurcation or in the left common iliac artery. It was considered that surgery was indicated, and Dr. C. J. Officer Brown performed a laparotomy, using cyclopropane anæsthesia, when the baby was twenty-one hours old. Operation revealed the following findings. The left common iliac artery was in spasm, being much narrower than the right. Both arteries were pulsating. The left common iliac artery was opened, but no thrombus could be demonstrated. Fine polythene tubing was then passed down the artery as far as the external iliac artery, where there appeared to be a block. Owing to the fineness of the arteries, dissection could not be carried down to this point. Two measures to relieve the arterial spasm were then carried out—namely, the injection of a solution of heparin down the left common iliac artery, and stripping of the sympathetic fibres from the aortic bifurcation and from the left common iliac artery. Post-operatively the gangrenous foot was kept dry and dusted with "Penacrin" powder. The dressings were disturbed as little as possible. Penicillin and streptomycin were given for one week, and customary precautions in the management of a premature infant were taken.

Within two hours after the completion of the operation, the right foot was a much better colour. The left foot looked much the same, but the extension of the gangrene appeared to have been arrested. Two days later the right foot was almost normal, and the discoloration of the left leg had begun to recede. From that time onwards there was a steady improvement in the left foot, a definite line of demarcation appearing on the foot. One of the most interesting features of the progress was the appearance, on the fourth day, of areas of normal circulation on the third and fourth toes, previously quite black. One week

after operation fluid was aspirated from the blistered gangrenous area to avoid spontaneous rupture and ulceration. As the gangrenous area became dry, it shrank, leaving healthy tissue beneath, until the actual area of slough was reduced to a small strip along the lateral aspect of the foot, including the small toe. The slough finally separated six weeks after operation. The baby was discharged from hospital aged seven weeks and weighing six and a half pounds. He was an apparently normal baby and had normal movements in both legs and feet.

Dr. C. J. Officer Brown, in opening the discussion, said that he considered that the operation was probably unnecessary. He thought that a saddle thrombus at the aortic bifurcation was the probable cause, but no thrombus was found at operation. In future he would defer operation and use heparin and dicoumarol. Perhaps papaverine injected into the aorta might be of value.

Dr. Kate Campbell said that she thought that surgical treatment had helped the patient, as improvement dramatically followed the operation. She felt that a thrombus was the most likely cause and could have been disturbed by surgical manipulations.

Dr. F. Douglas Stephens stated that in his experience congenital anomalies of the rectum were sometimes accompanied by atresia or stenosis of the external iliac artery, which might be unilateral. He thought that at operation it would be difficult to distinguish spasm from atresia.

Confusional Episode following an Operation for Torticollis.

Dr. H. D. Irish presented the case of a male and only child, aged twelve years, with a torticollis and left facial hemiatrophy, who had been admitted to the Royal Children's Hospital for division of his left sterno-mastoid muscle. After an uneventful operation the boy was constantly complaining, demanding attention and announcing that he would not get better. On the sixth day after operation he fell out of bed and hit his head. A skiagram of the skull showed no fracture. During the next few days he began to imagine that ten shilling notes were flying around the room, and that there were letters for him in the ventilators. He complained that his bed was wet when it was not and passed urine on the floor on a few occasions. The boy's mother had noticed no change in his behaviour on a previous visit to the hospital. At the time of her next visit, on the eighth post-operative day, the patient was jumping about in bed and appeared to be unhappy. He did not want his mother to remain, and many of his statements were meaningless. His behaviour remained thus for about three weeks. He took no interest in people, was aggressive and did not wish to talk. He cried for long periods with little provocation. His mother visited him daily, but he could not recall her visits. However, his mother's presence seemed to help him, and gradually he began to smile and take an interest in his surroundings. After six weeks in hospital he was discharged in a reasonably well-orientated state, but with little idea of time sequences or relationships.

Dr. Irish then traced the child's early history. His development after birth had been apparently normal. His school progress was fairly good, but he repeated grade IV. In 1952, when almost eleven years of age, he was tested by a psychologist of the Education Department. Despite his intelligence quotient (Binet L) his reading ability was only at grade II level and his arithmetic at middle grade III level. His attention and concentration were then good. He was placed in an opportunity grade in January, 1953. His mother and father had separated when the child was aged six months because of the father's infidelity. Mother and son had since lived in an apartment house. The child had seen his father only twice since his parents had separated, the last time being six months before operation. He had not appeared interested in meeting his father, but he used to ask about his father and had told the children at school that his father had been shot during the war. The boy's mother had admitted that she spoiled him. She disliked him crying, in case others in the household would ask questions. The child was quiet and obedient, but he was not reliable with errands, and he could not manage money. Since going to the opportunity class he had preferred to remain inside rather than play with his fellows. Apart from this, the mother had noticed little change in him. His grandmother thought that he had changed, but was unable to define the nature of the change. His aunt thought that he was a nice boy but odd.

Commenting on the child's progress since discharge from hospital, Dr. Irish said that he had recommenced school two weeks after discharge. At school his concentration had not been good, his reading and arithmetical ability had not improved, and he was forgetful.

Dr. Irish then summarized the results of psychological tests. Whilst still in hospital the boy was interviewed by the psychologist, who observed that his facial expression and voice were strange. His reasoning at times was also strange, as demonstrated by some of the vocabulary responses and occasional neologisms. At the same time he seemed to have maintained the ability to perceive concrete and often abstract relationships, and his immediate memory appeared unimpaired. Both his reading and the vocabulary answers were marked by variability. Seven months after surgery had been carried out a Rorschach test was performed. During the test he made sudden remarks, such as: "What's the operating room like? Do you go there? Do the sisters go in there?" "What happened to J.H.? He died in the hospital." Explaining details of the Rorschach test, Dr. Irish said that the child showed few popular responses commonly given by normal subjects. Most of the responses were either crude or poorly differentiated, and in three instances non-existing details were interpreted. Repetition of the same concept for several cards pointed to poverty of ideas and mental rigidity. There were frequent personal references, such as seeing the cards as "Two men going to sit down and operate on somebody, it's me, is it me?, is this supposed to be me?" or "Looks like a part of someone, this is the back where it is crooked, it's me—I have three kinds of blood in me—red, orange and green" (reference to colours of the card). This indicated blurring of the boundaries between himself and outside reality.

The test suggested the presence of a disorganizing process in a boy of originally low average intelligence. Its effect seemed to be inability to abstract, lack of awareness of daily problems and distorted perception of reality. Underlying these were severe inner tension and insecurity, coupled with uncontrolled emotional reaction to the outside world and resulting in inadequate and irrational social relationship. Several specific signs, such as variability of the form quality, repetition of the same concept and its content (inside the body), personal references and interpretation of imaginary details, reviewed in relation to the total content, were strongly suggestive of schizophrenia.

Dr. Irish concluded by asking whether the boy's clinical state represented a confusional episode occurring in a dull subject and precipitated by an operation, whether it represented a latent schizophrenia which had become overt after admission to hospital and surgery, or whether the confusional episode was due to the action of narcotics such as atropine. To what extent had the parental separation and cramped living conditions contributed to the boy's illness?

Dr. John Williams opened the discussion and said that the case was topical in view of recent discussions upon the effects on children of admission to hospital. The boy was profoundly affected and quite psychotic for some weeks following a minor operation and as yet had not completely recovered. Dr. Williams was not certain whether the boy was schizophrenic or whether he was a dull boy recovering from a confusional state. The evidence suggested that admission to hospital was responsible to some extent for the boy's condition, and one needed to consider that aspect when advising routine operations on maladjusted children.

Dr. W. R. Forster said that he did not think that the boy was unduly upset before operation, and it would be almost impossible to refer all children undergoing routine operations to the psychiatrist.

Dr. Kate Campbell stated that in her opinion poor nutrition predisposed to post-operative confusional states, and she wondered whether that might have been a factor, particularly in view of the home conditions.

Dr. G. Raleigh Weigall asked whether the disfigurement might have predisposed to the boy's post-operative state.

Dr. Irish replied that, although a thorough investigation of the boy's diet had not been undertaken, his general nutrition was excellent and he was a big boy for his age. He felt that the boy's condition was more than a confusional state, particularly in view of its persistence, and that the disfigurement was probably only one of a number of factors involved.

The Borderline Between Medical, Psychological and Educational Fields.

Dr. J. R. Darling, Headmaster of Geelong Church of England Boys' Grammar School, delivered an address entitled "The Borderline between Medical, Psychological and Educational Fields". He said that he had once had the experience of sitting at a dinner next to Mr. H. G. Wells.

It was a very good dinner, and Mr. Wells enjoyed his dinners. He paid no attention to Dr. Darling at all until the port. At that point he turned to Dr. Darling rather fiercely and said: "I understand that you are a schoolmaster —a schoolmaster once he has reached forty is either a confirmed hypocrite, or else has come to understand that he is engaged in a research to which there is no answer. Which are you?" Dr. Darling said that it was about fourteen years since that had happened and he had failed, even in all those years, to discover what was the correct answer. At the time he feared that he could only mumble, and he was sure that Mr. Wells found him merely inadequate.

Dr. Darling went on to say that he supposed that headmasters, anyhow, were always a bit of both. They had to put up some sort of a bluff in front of the boys, and he rather thought that one of the weaknesses of the present headmaster in comparison with his bearded predecessors was just that, clean shaven and transparent as modern headmasters were, they failed to convince that they were fully confirmed or convinced in their hypocrisy, and consequently, in their desperate efforts at understanding and sympathy, they failed to give the young those things which they really had the right to expect from their official elders—certainty and security. In the old days when one committed a crime one knew that it was a crime, and that as a crime it would be treated. Nowadays a boy was much more likely to be met by inexpert attempts to psychoanalyse him and to explain to him why he had been so wicked, which was usually really a desperate attempt on the part of the master to disclose why, if he himself had committed the crime in question, he imagined that he would have done so. It was all very sympathetic and intended to be helpful, but Dr. Darling doubted whether it was much more effective than the simpler methods of fifty years previously. He wondered whether it was possible to give boys what they really needed without being something of a hypocrite—in other words, without giving them the impression that the masters themselves were sure and certain about right and wrong and proof against all manner of temptation.

Dr. Darling said that this was relevant only because it was one's failure to help when help seemed necessary that was so distressing, and because he could not help feeling that the medical profession with all its new and specialized knowledge had lost some of the wisdom which used to be so great an assistance in the home and in the school, not only when a member of the family was ill in the sense of being diseased, but when he was ill in the sense merely of being disordered or not well, or, more precisely expressed, not whole or integrated, which was the same thing, at least philologically, as not being holy. Dr. Darling wondered if it would come as a great shock to members of the medical profession to be told that it was part of their duty to keep their patients holy. It was the burden of what he had to say that the doctor should at least make some contribution towards that end.

Dr. Darling suggested that he should first risk a definition of what he meant by education. To him it meant primarily taking part in the normal process of growing up to maturity. It was therefore a process continuing throughout life, but of special importance during the years when the physical changes were most marked. It was for the medical profession to tell him what physiological changes took place in the process, and how those might affect the minds and characters of boys. He knew for his part how rare it was for that to be, as it surely should be, a natural and easy process. He could see some of the things which in the service of social needs schoolmasters did wrongly to complicate the problem, but he was not satisfied that all the answer lay in his own field alone, and that was what he wanted to get out of the medical profession.

Growing up to be a full and integrated person involved a whole lot of changes, each, Dr. Darling thought, closely involved in the others. It might not be "growing like a tree in girth that makes man better be", but growing in girth and stature and strength of muscle was a necessary part of development, and not always an easy one. There were boys who grew too quickly for their strength, and overstrained their hearts or backs or some other less obvious part: there were boys who grew too soon and were much too big for their age, and more distressing still there were boys who grew too late and were too small for their age. In both of the two last cases the boys were unhappy in consequence. In spite of the biblical dictum about not being able to add a cubit to their stature by any amount of taking thought, they did take a great deal of thought and worry desperately. Dr. Darling said that he was not expecting the doctors to be able to help in that particular, but it would seem to him to be part of the doctor's job to watch the point and possibly to warn parents and schoolmasters what to expect. How possible, for instance, was it for a boy of fourteen who put on three inches of height in a year to work hard at the same time and to take an ordinary part in school life? Was it worse or better for him if he delayed his growing until sixteen or seventeen and then grew rapidly? Or did it not matter at all?

That was only one very obvious part of the highly complex business of growth. Dr. Darling had heard someone, a medical man, he thought, talk of the body as a vast orchestra of instruments all designed to work together in the presentation of a symphony. He said that he could well imagine that that was a good simile, but to his way of thinking the body was only one section of the orchestra. To be complete it must include the mind and the soul—it must take into account parts of itself which were not solely physiological, such as sex and emotions and moral principles and religion, each of which might want unconsciously or consciously to play the dominant theme. The danger of discord was real enough in the case of even a supposedly grown-up adult: what might it not be when all the members of the orchestra were, while yet attacking the symphony, also changing their instruments, increasing the size of their brass, practising upon all four strings and even trying out a fifth or sixth, enjoying the rhythm of the drums to the exclusion of all other sounds, or timidly withdrawing under the grand piano to get away from the noise? How much confusion was the worse confounded when the conductor (Dr. Darling supposed he would be the super-ego) was himself very hazy about harmony and was in doubt as well whether he was playing in a concert or a music hall! Yet without over-stressing the simile to the point of absurdity that was more or less what happened; and, as it seemed to Dr. Darling, the general confusion, more than the specific confusion of sex, accounted for what Dr. Kurt Hahn called the cantankerous age of puberty. It certainly made him wonder a bit whether the well-intentioned efforts of responsible elders to instruct were likely to have better results than a judicious withdrawal in the hopes that somehow the orchestra would work out its own salvation.

Dr. Darling asked his audience first to think what a boy—and it was worse with a girl, but he did not know so much about them—had to do in the years between, say, twelve and eighteen. He had to put on a minimum of eight inches and, say, four stone, he had to change and develop innumerable cells in his body and to grow and harden muscles, and to make all the other physiological changes of which Dr. Darling was ignorant. In addition he had to adjust himself to those changes, to learn to use a strength which when he was a small boy had been negligible. He found, for instance, that when, as he had always used to do, he applied force to a key stuck in a lock, this time, instead of merely jarring his fingers, it broke—which annoyed father. That kind of thing was happening all the time. With the new strength he had to develop quite a new line of behaviour.

On the top of all that there was his education, a whole bevy of fantastic subjects, seeming at first sight to have very little relevance to the real problems of his life as it was; but all of which he was assured were indispensable if he was to succeed in after life. Just at that very moment, when, to change the metaphor, he was furthest out at sea and had the rudder lines crossed, the pressure was applied and he was told to put on speed. Examinations were near at hand—his life hung in the balance. It was not surprising that he had an inclination to go round and round.

At the same time, competitive sport—introduced theoretically as a substitute for the play activities of the child, but really by cunning headmasters in order to keep the little brutes out of mischief—became nearly professional. Dr. Darling said that his very own son, aged seven, had said to him about six months earlier, "Daddy, football isn't a game you play, is it? it's something you learn to be good at", but his son, of course, had had the advantage of very early association with a public school.

Dr. Darling went on to say that so far they had only touched the surface of the problem; for, in spite of their education, the boys' minds really were developing, new interests were swimming like planets into their ken—whole continents of science, little islands of philosophical thought, great streams of history and the dim shapes of iceberg cliffs of economic doubt.

It was at that moment that in its wisdom the Church decided that it was suitable to have them confirmed. To wait longer was to risk losing them altogether; to do it sooner would be to ask them to accept something which they could not understand. It might be argued that it was difficult even at fifteen to understand usually the mysteries hidden from Saint Thomas Aquinas.

Behind all this was their real growing-up as understood by psychology, the growing-up to maturity or integration, which was not, of course, complete in anyone, but the most difficult part of which had to be done in youth, if it was to be successfully done at all. Dr. Darling said that by growing up in that sense he meant the development of the capacity to stand on one's own feet. He quoted: "Our stability is but balance—and conduct lies in masterful administration of the unforeseen." A man was not adult who allowed himself to be blown hither and thither by every vain wind of doctrine or by "the sin which doth so easily beset us", by greed, by lust, by bad temper, by fear or by jealousy. Very few people were, on any standard, adult—none achieved the full manhood of the measure of the stature of Christ, but He did show men what adult manhood ought to be like, if they could reach it. In adolescence they were still learning.

Dr. Darling expressed the opinion that there were very few bad children, plain and simple—a few real criminals perhaps, a rather larger proportion of mischievous, thoughtless and irritating children, and the main mass merely maladjusted children.

Psychologically there were two main causes of maladjustment: the fear of not being wanted or loved, which showed itself by way of compensation in lying, stealing and dishonesty; and, more common, the fear of not being good enough—in other words, of not being able to compete with the world. That showed itself in rebellion, in the case of the more vigorous, but more commonly in lethargy or escape—escape into phantasy living, comics and serials, sloppy novels, film addiction and so on; later in gambling, drink or insanity, which might or might not be a real escape.

Dr. Darling said that as the audience was medical and medicine was alleged to be a science—though, of course it was hardly more so than education or economics—he ought to give cases to justify his assertions. But, as an American friend had said to him recently, it was necessary to distinguish between the facts and the truth. The trouble with cases was that the facts were the truth only in that one case and no amount of case facts would really establish a general truth. There was more chance of arriving at that by a generalized experience and intuition, provided, of course, that, having reached it, one realized also the strength of the obverse that the truth thus reached was not at all necessarily the facts in every single case, but only a way of looking at the facts.

Dr. Darling remarked that what he had said were generalizations, but he thought that they helped in the understanding of quite a considerable number of the problems with which they were habitually faced. In the achieving of integrated personality those assurances of security and affection and of competence within one's environment were the essentials. The complexities of growing up, as he had developed them earlier, did not make the process easier.

Of all problem children the most difficult to deal with was the lethargic, the boy who lacked energy and vitality, whose object in life seemed to be at all costs to escape notice, whose idea of heaven seemed to be oblivion. Dr. Darling said that he could, of course, see good psychological reasons for such a boy's condition, he could see perhaps how the boy had started to go wrong and even when. The boy belonged to the category of those who lacked confidence because they lacked competence. One could therefore help him slowly to overcome his diffidence. If one could get him into a boat, that more than anything might do the trick. Rowing, of all sports, if indeed it was one, alone had that particular virtue as an educational instrument (perhaps because, albeit facing in the wrong way, one did at least get somewhere by rowing, and that was more than could be said of any other sport).

However, Dr. Darling said that he was not satisfied. He believed that it was too easy an answer altogether to say that the lethargic boys, or indeed other maladjusted boys, were wrong only in their minds or characters. He could not accept any clear distinction between mind and body, body and soul. If the mind reacted upon the body to create physical symptoms of disease, then the same thing happened vice versa, and the body reacted upon the mind—and, if so, then surely the doctor, who looked after bodies and understood them, ought to be able to help more than he seemed to do in this sort of problem. Dr. Darling said that he had not the faintest idea how, and perhaps—indeed probably—he was talking nonsense.

He had nothing more to say, because, as he had said at the beginning, he did not really want to do any more at the present stage than to pose the question and to leave to the discussion the elucidating of an answer if there was one.

On the educational side there were answers, and it would be realized, for instance, that the whole Timbertop idea was the outcome of this kind of thinking—and, if one could judge so early, it really was working out quite astonishingly, as Dr. Darling had hoped that it would. But if there was any answer, found or to be found, on the medical side, then it could come only from a trained doctor, who had a knowledge of psychology, who was interested in boys, and who was ready and able to live amongst and be with them when they were ostensibly well, as well as curing them from disease when they were obviously sick.

Dr. Darling said that the plea which he was making was for help from the medical profession as a whole, not merely from the psychiatrist when the trouble had gone too far. One of the results of the great increase in variegated knowledge which was characteristic of the present age was the increase of specialization of function and, as an almost unavoidable consequence, a loss of general wisdom. Analysis had gone too far, and what was needed now was synthesis. Against the possibility of that almost every modern tendency combined—the largeness of communities, the corresponding size of schools, the specialism of education and in the work of the medical profession, and the lack of organic life in society, which resulted partly from the weakened influence of the Church. To those must be added, in some cases, the breakdown of family life and influence. The resultant was a tendency towards division and disintegration, and in the absence of faith there were no unifying forces to counteract them.

In some communities, especially in the United States, local schools had become the focal points of social life, centres of education and activity not only for the children, but for the parents also. The Peckham Experiment was an attempt to make the health of the community focal and did at least recognize the connexion between health and wholeness of mind as well as of body. Dr. Darling's plea was that the medical profession should recognize its educational obligations, and that the two professions should endeavour to work more closely together and derive benefit each from the other's experience.

DR. ROBERT SOUTHBY opened the discussion and thanked Dr. Darling for his most stimulating address. Dr. Southby mentioned the duty of the family doctor in caring for the home as a whole in addition to the general care of the patient and stated that the medical profession had shown increasing interest in attempting to integrate body, mind and soul. He said that the problem of very rapid or very slow growth was a common one, and from the medical aspect was bound up with the internal secretions. He further stated that in his opinion masturbation and homosexualities were extreme manifestations of the normal behaviour at puberty. Dr. Southby concluded by congratulating Dr. Darling on the Timbertop experiment, which he felt sure would assist in resolving some of the problems encountered in the difficult age group under discussion.

DR. JOHN WILLIAMS thanked Dr. Darling and stressed the importance of recognizing mental upset in the otherwise healthy child. He said that he considered that the physician, the educationalist and the minister of religion should all work together. He went on to say that the backward child at school might be backward for one or more of a number of reasons—poor home conditions, poor school, partial deafness or poor sight, lack of intelligence and inability to learn, or sometimes self-consciousness. All those factors must be considered in the handling of the backward child. Growing-up was very difficult. The difficulties encountered around puberty were due not solely to the maturation of the sex glands, but also to the numerous other interests and problems which children found at that age. The psychopathic child was not affected by discipline, affection *et cetera*, and the condition often arose as the result of maternal deprivation and lack of security in infancy.

MR. CHAMBERS made a plea for better teamwork amongst the school teacher, school medical officer, psychologist and family physician, particularly in regard to the child needing environmental adjustment. In general he felt that the problems could be solved by conferences, and steps could often be taken to alter the environment or to help the child to adjust himself to it.

DR. G. RALEIGH WEIGALL stated that he considered proper management in pre-school age essential if problems relating to adolescence were to be overcome. He suggested that educationalists might assist by instructing parents in management before the child actually commenced school.

DR. MARY LANE made a plea for less school examinations during the period between the ages of twelve and eighteen years.

Dr. Darling, in reply, referred to the "lethargic boy" who responded to stress by becoming more lethargic. He said that he was not sure how to manage that problem, but felt that life should be made less arduous over that period. Referring to the question of examinations, Dr. Darling said that it was an almost insoluble problem at the present time. He concluded by saying that one of the characteristics of modern society was the breakdown of social organization. In the past, the Church had been the centre of social life in the community.

Congresses.

INTERNATIONAL CONGRESS OF INTERNAL MEDICINE.

THE third International Congress of Internal Medicine will be held in Stockholm, Sweden, from September 15 to 18, 1954. A full scientific and social programme has been arranged. Further details are available from the Secretariat of the Congress, Karolinska sjukhuset, Stockholm 60, Sweden. Application forms for attendance are required not later than June 1, 1954.

Notice.

THE R. H. FETHERSTON MEMORIAL LECTURE.

THE fourth R. H. Fetherston Memorial Lecture will be delivered by Professor Lance Townsend, Professor of Obstetrics and Gynæcology in the University of Melbourne, on Wednesday, April 7, 1954, at 8.15 p.m., in the Lecture Theatre, Anatomy School, University of Melbourne. The subject will be "Obstetrics Today and Yesterday".

Post-Graduate Work.

THE ROYAL MELBOURNE HOSPITAL RESIDENT MEDICAL OFFICERS' CLUB.

FRIDAY lunch-time clinico-pathological meetings will commence at the Royal Melbourne Hospital on Friday, March 26, 1954. A buffet luncheon will be served at 12.30 p.m., and the meeting will commence sharp at 1 p.m., concluding at approximately 1.45 p.m. All medical practitioners are cordially invited. The programme is as follows: March 26, symposium on "Disseminated Lupus Erythematosus", Dr. G. L. Christie, Dr. E. Finckh, Dr. J. L. Frew. April 2, symposium on "Pulmonary Emphysema", Dr. K. H. McLean, Dr. T. H. Steel, Dr. J. I. Hayward. April 9, "The Case For and Against Early Surgery in Acute Cholecystitis" (with discussion to follow), Dr. G. R. A. Syme (against), Dr. H. H. Eddey (for). April 23, "Ulceration of the Mouth", Dr. G. Swinburne. April 30, "Symposium on Hæmolytic Anæmia", Dr. J. H. Bolton and Dr. T. Hurley. May 7, "Carcinoma of the Colon", Dr. E. S. R. Hughes. May 14, "Modern Methods of Electrocardiography", Dr. T. E. Lowe. May 21, "Tuberculous Meningitis", Dr. G. A. Penington. May 28, "Sympathectomy in the Treatment of Cardiac Pain", Dr. A. E. Coates.

Australian Medical Board Proceedings.

TASMANIA.

THE following have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners: Cannon, John Dominic, M.B., B.S., 1953 (Univ. Melbourne); Hamilton, John Simon, M.B., B.S., 1953 (Univ. Melbourne); Quatermass, Malcolm Ernest, M.B., B.S., 1952 (Univ. Queensland); Drew, John Malcolm

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED FEBRUARY 27, 1954.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	4(1)	2(1)	..	..	3(3)	..	..	..	9
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	3	..	3
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	2(1)	..	..	..	..	..	..	3
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	1(1)	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	13(11)	2(2)	6(5)	..	1	1	1	..	24
Diphtheria	5(1)	..	2	..	1(1)	..	..	..	8
Dysentery (Bacillary)	..	..	3(3)	..	1	..	..	..	4
Encephalitis	1(1)	1	..	..	..	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	1(1)	9(5)	..	..	1	..	..	..	11
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	6	..	6
Leptospirosis	..	..	..	..	..	..	..	..	..
Malaria	..	..	..	..	1(1)	..	..	..	1
Meningococcal Infection	3(1)	3(1)	..	..	3	..	..	1	10
Ophthalmia	..	..	..	..	1	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	1	1
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	20(10)	8(7)	..	2(2)	40(36)	..	..	7	77
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	7(5)	..	..	14(7)	..	..	..	21
Salmonella Infection	..	..	..	..	1	..	..	..	1
Scarlet Fever	6(4)	16(8)	2(1)	1(1)	2(2)	1	..	1	29
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	38(27)	28(21)	10(3)	3(2)	9(8)	7(3)	..	..	95
Typhoid Fever	..	3(3)	..	..	..	..	..	..	3
Typhus (Flea-, Mite- and Tick-borne)	1	..	..	..	1(1)	..	..	..	2
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

McFarlane, M.R.C.S. (England), L.R.C.P. (London), 1937, F.R.C.S. (England), 1949; Currie, Robert Andrew, M.B., B.S., 1953 (Univ. Melbourne); Tymms, Brian Blake, M.B., B.S., 1952 (Univ. Sydney); Patterson, Margaret Matilda, M.B., B.S., 1950 (Univ. Melbourne); Foster, Allan John, M.B., B.S., 1953 (Univ. Melbourne); Lethlean, Allan Keith, M.B., B.S., 1953 (Univ. Melbourne).

Deaths.

THE following deaths have been announced:

CROSBIE.—Clement Barrie Crosbie, on March 6, 1954, at Brinkworth, South Australia.

KANTOR.—Richard Kantor, on March 13, 1954, at Sydney.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Manass, Viktoria, registered in accordance with the provisions of Section 17 (1) (*c*) of the *Medical Practitioners Act*, 1938-1953, 359 Chapel Road, Bankstown, New South Wales.

Petersons, Zigrida, registered in accordance with the provisions of Section 17 (1) (*c*) of the *Medical Practitioners Act*, 1938-1953, 13 Dowding Road, Panania, New South Wales.

Morgenstern, Herman, registered in accordance with the provisions of Section 17 (1) (*c*) of the *Medical Practitioners Act*, 1938-1953, 9 Miller Street, Petersham, New South Wales.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association: Bedville, Bryant Lewis, M.B., B.S., 1954 (Univ. Sydney); Boden, Richard William, M.B., B.S., 1954 (Univ. Sydney); Cranney, Kenneth Sidney, M.B., B.S., 1954 (Univ. Sydney); Da Roza, Charles Bruno, M.B., B.S., 1954 (Univ. Sydney); Hollings, Raymond Moulton, M.B., B.S., 1954 (Univ. Sydney); Lumer, Rodney Hugh, M.B., B.S., 1954 (Univ. Sydney); Ng, Yook Wee, M.B., B.S., 1954 (Univ. Sydney); Nicholson, Margaret Faith, M.B., B.S., 1954 (Univ. Sydney); North, Brian Keith, M.B., B.S., 1954 (Univ. Sydney); Sweetapple, William Edmond, M.B., B.S., 1954 (Univ. Sydney); Taylor, Hugh Edmund Carlyle, M.B., B.S., 1954 (Univ. Sydney); Travers, Desmond Benedict, M.B., B.S., 1954 (Univ. Sydney); Velens, Victoria Lydia, M.B., B.S., 1954 (Univ. Sydney); Hoyle, Mary Beatrice, M.B., B.S., 1953 (Univ. Adelaide); King, Bruce McEwan, M.B., B.S., 1953 (Univ. Sydney); Segal, Isaac, M.B., B.S., 1953 (Univ. Sydney); Smith, Graham Beresford, M.B., B.S., 1953 (Univ. Sydney); Tudehope, James Robert, M.B., B.S., 1953 (Univ. Sydney); Crooks, Royle Reuben, M.B., B.S., 1952 (Univ. Sydney); Holland, Robert Alastair Beveridge, M.B., B.S., 1952 (Univ. Sydney); White, Harold John, M.B., B.S., 1951 (Univ. Sydney); Mezo, Bela Albert, registered in accordance with the provisions of Section 17 (1) (*c*) of the *Medical Practitioners Act*, 1938-1953; Grunwald, George Bela, registered in accordance with the provisions of Section 17 (1) (*c*) of the *Medical Practitioners Act*, 1938-1953.

Medical Appointments.

Dr. R. R. Webb has been appointed deputy superintendent of the Mental Hospital and Receiving House, Royal Park, and the Receiving House, "Pleasant View", Wood Street, Preston, Victoria.

Dr. G. A. Goding has been appointed superintendent of the Mental Hospital, Sunbury, Victoria.

Dr. H. M. Bower has been appointed superintendent of the Mental Hospital, Beechworth, Victoria.

Dr. E. L. Roberts has been appointed superintendent of the Mental Hospital and Receiving House, Ballarat, Victoria.

Dr. M. Delatycki has been appointed deputy superintendent of the Mental Hospital, Ararat, Victoria.

Dr. S. P. Derham has been appointed deputy superintendent of the Mental Hospital, Sunbury, and of the Janefield Colony, Janefield, Victoria.

Dr. J. L. Gorman has been appointed superintendent of the Mental Hospital, Ararat, Victoria.

Dr. H. J. C. Edmonds has been appointed inspector of inebriates institutions in Victoria.

Dr. J. L. Gorman has been appointed psychiatrist superintendent, Mental Hygiene Branch, Department of Health, Victoria.

Dr. H. M. Bower has been appointed psychiatrist superintendent, Mental Hygiene Branch, Department of Health, Victoria.

Dr. W. D. Proudman has been appointed out-patients' registrar to the Royal Adelaide Hospital.

Diary for the Month.

MARCH 30.—New South Wales Branch, B.M.A.: Council Meeting (Election of Officers).
APRIL 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
APRIL 7.—Victorian Branch, B.M.A.: Branch Meeting.
APRIL 7.—Western Australian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.
side Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Tasmania: Part-time specialist appointments for the north-west coast of Tasmania.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 *per annum* within Australia and the British Commonwealth of Nations, and £6 10s. *per annum* within America and foreign countries, payable in advance.